



**Partners in Flight
Bird Conservation Plan**

Allegheny Plateau
(Physiographic Area 24)



Partners In Flight Landbird Conservation Plan:

Physiographic Area 24: Allegheny Plateau

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EXECUTIVE SUMMARY

Area - 12,261,100 ha

Description - The Allegheny Plateau covers much of west-central Pennsylvania, the southern tier of New York to the base of the Adirondack Mt., and a portion of northeast Ohio. This area consists primarily of extensively forested uplands, including the Catskill Mountains in NY, Pocono Mountains in PA, and Allegheny National Forest in both states. This is a transitional area dominated by oak-hickory forests towards the south and beech-maple forests towards the north. White pine and hemlocks also are an important component of the forests, more so historically. Small but important patches of spruce-fir forest occur on the Catskill High Peaks and at a few sites in northeastern PA. Several major river valleys dissect the highlands, and the Finger Lakes of central NY drain the northern portion of the physiographic area towards Lake Ontario. Roughly 70% of this area is forested today, with agriculture dominating primarily at lower elevations in western New York, the Susquehanna River valley, and in Ohio.

Priority bird species and habitats -

Disturbance/ Scrub-shrub -

Golden-winged Warbler – Declining precipitously; uses a variety of disturbed habitats, primarily at higher elevations.

American Woodcock -- Shows steep population declines; requires combination of forest clearings, second-growth hardwoods, and moist soils for foraging.

Objective: roughly 260,000 ha of disturbed or shrubby habitat is required to support the entire habitat-species suite (e.g. 275,000 pairs of Field Sparrows); of this, 18,000 ha should be suitable to support 8,500 pairs of Golden-winged Warblers.

Grasslands -

Henslow's Sparrow – Population declining precipitously; mostly on reclaimed mine sites in Pennsylvania and unmowed pastureland in NY and Ohio.

Upland Sandpiper – area-sensitive; occurs in pastures and reclaimed mine sites.

Objective: roughly 300,000 ha of grassland habitat is required to support entire habitat-species suite (e.g. 275,000 pairs of Bobolinks); of this, 2,400 ha should be suitable to support 5,000 pairs of Henslow's Sparrow; 100,000 ha should be suitable to support 25,000 pairs of Grasshopper Sparrow; and 6,600 ha should be in patches large enough to support 500 pairs of Upland Sandpipers.

Mature deciduous and mixed forest -

Cerulean Warbler – Requires tall, broken canopy in upland oak-hickory and riparian (sycamore-cottonwood) forests

Worm-eating Warbler – Favors mature upland oak-hickory on steep slopes with dense shrubby understory.

Wood Thrush – Generalist in mid-and late-successional forests with dense deciduous understory

Canada Warbler – Favors wet sites in northern hardwood and mixed forest with dense shrubby understory (often rhododendron).

Louisiana Waterthrush -- Requires late succession (>60 yr); rocky, flowing streams; sensitive to declining stream quality and loss of riparian forest buffers.

Objective: roughly 3.2 million ha of hardwood and mixed forest is required to support entire habitat-species suite, including 1,000,000 pairs of Wood Thrush; 25,000 ha of mature oak-hickory and riparian forest is required to support 25,000 pairs of Cerulean Warblers and 6,000 pairs of Worm-eating Warblers; 60,000 ha of northern hardwood forest should be suitable to support 28,000 pairs of Canada Warblers. In addition, 24,000 km of forested streams are required to support 16,000 pairs of Louisiana Waterthrush.

Mountaintop coniferous forest -

Bicknell's Thrush – Southernmost (disjunct) population on Catskill High Peaks

Objective: Numerical population or habitat-area objectives have not yet been set; all sites supporting Bicknell's Thrush should be strictly protected.

Conservation recommendations and needs -

This area has experienced an increase in forest cover in recent decades. Changing age-structure of the forest, due to succession and past forestry practices, appears to have negative effects on high-priority forest birds, however. Reduction of forest understory and regeneration due to overpopulation of white-tailed deer, as well as forest-health problems caused by insect and disease outbreaks, also represent major conservation issues for forest birds. The relatively large proportion of forest land in public (mostly state) ownership presents an important opportunity for implementing conservation objectives. In particular, identification and protection of important sites for breeding Cerulean Warblers should be a high priority. Abandonment of agriculture, especially dairy farming, may continue to provide temporary habitat for shrub-nesting birds, but threatens the continued existence of healthy populations of grassland species. Active management for Henslow's Sparrow and Golden-winged Warblers, where feasible, should be high priorities, especially on reclaimed strip mine sites. It is ironic that the strip mines that once devastated vast areas of forest are of incredible value to birds once abandoned, but are of least value if allowed to grow back into forest. If maintained as grass, they support Henslow's Sparrow, and if kept in early successional shrubs they support Golden-winged Warblers, but there is no single condition that will support both birds. An additional priority is the identification and study of remaining sites where Golden-winged Warblers may persist in sympatry with expanding Blue-winged Warblers. In the high peaks habitats that support the southernmost populations of Bicknell's Thrush, ski-area development and other recreational activities are current threats. Strict protection of important sites for Bicknell's Thrush should be sought.

Specific conservation recommendations in this physiographic area include:

- determine range of suitable habitats and identify present breeding sites for Golden-winged Warbler in this region;
- identify and designate Bird Conservation Areas (BCA), within which long-term sustainability of priority forest bird populations is a primary management objective;
- identify present-day concentrations of Cerulean Warbler within the region; determine protection status and specific threats at these sites;
- identify most important sites for Henslow's Sparrow and determine range of suitable habitat conditions; manage sites on public lands to maintain suitable conditions if necessary.
- identify, and either acquire, manage or restore additional grasslands > 50 ha with potential to support Henslow's Sparrow or Upland Sandpiper.

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INTRODUCTION

Continental and local declines in numerous bird populations have led to concern for the future of migratory and resident landbirds. Reasons for declines are complex. Habitat loss, degradation, and fragmentation on breeding and wintering grounds and along migratory routes have been implicated for many species. Additional factors may include reproductive problems associated with brood parasitism and nest predation. Scientists and the concerned public agreed that a coordinated, cooperative, conservation initiative focusing on nongame landbirds was needed to address the problem of declining species. In 1990, Partners in Flight (PIF) was conceived as a voluntary, international coalition of government agencies, conservation organizations, academic institutions, private industry, and other citizens dedicated to reversing the downward trends of declining species and "keeping common birds common."

PIF functions to direct resources for the conservation of landbirds and their habitats through cooperative efforts in the areas of monitoring, research, management, and education, both nationally and internationally. The foundation for PIF's long-term strategy for bird conservation is a series of scientifically based Landbird Conservation Plans, of which this document is one. The geographical context of these plans are physiographic areas, modified from original strata devised by the Breeding Bird Survey (Robbins et al. 1986). Twelve physiographic areas overlap the northeastern United States (USFWS Region-5). Although priorities and biological objectives are identified at the physiographic area level, implementation of PIF objectives will take place at different scales, including individual states, federal agency regions, and joint ventures.

A. Goal

The goal of each PIF Bird Conservation Plan is to ensure long-term maintenance of healthy populations of native landbirds. This document was prepared to facilitate that goal by stimulating a proactive approach to landbird conservation. The conservation plan primarily addresses nongame landbirds, which have been vastly underrepresented in conservation efforts, and many of which are exhibiting significant declines that may be arrested or reversed if appropriate management actions are taken. The Partners in Flight approach differs from many existing federal and state-level listing processes in that it (1) is voluntary and nonregulatory, (2) focuses proactively on relatively common species in areas where conservation actions can be most effective, rather than the frequent local emphasis on rare and peripheral populations. Partners in Flight Landbird Conservation Planning, therefore, provides the framework to develop and implement habitat conservation actions on the ground that may prevent the need for future species listings.

B. Process

Partners in Flight Landbird Conservation Planning emphasizes effective and efficient management through a four-step process designed to identify and achieve necessary actions for bird conservation:

- (1) identify species and habitats most in need of conservation;
- (2) describe desired conditions for these habitats based on knowledge of species life history and habitat requirements;
- (3) develop biological objectives that can be used as management targets or goals to achieve desired population levels.;
- (4) recommend conservation actions that can be implemented by various entities at multiple scales to achieve biological objectives.

Throughout the planning process and during the implementation phase, this strategy emphasizes partnerships and actions over large geographic scales. Information and recommendations in the plans are based on sound science and consensus among interested groups and knowledgeable individuals. Specific methods used to complete this process are described within the plan or in its appendices. Additional details on PIF history, structure, and methodology can be found in Finch and Stangel (1993) and Bonney et al. (1999).

C. Implementation

This landbird conservation strategy is one of many recent efforts to address conservation of natural resources and ecosystems in the Northeast. It is intended to supplement and support other planning and conservation processes

(e.g. The Nature Conservancy Ecoregion Plans, USFWS Ecosystem Plans, Atlantic Coast Joint Venture, Important Bird Areas initiatives) by describing a conservation strategy for nongame landbirds that are often not addressed or only incidentally addressed in other plans.

PIF strategies for landbird conservation are one of several existing and developing planning efforts for bird conservation. PIF Bird Conservation Plans are intended to complement other initiatives such as the North American Waterfowl Management Plan, United States Shorebird Conservation Plan, and North American Colonial Waterbird Plan. Ongoing efforts to integrate with these initiatives during objective setting and implementation will help ensure that healthy populations of native bird species continue to exist, and that all of our native ecosystems have complete and functional avifaunal communities. In particular, the emerging North American Bird Conservation Initiative (NABCI) will provide a geographical and political framework for achieving these ambitious goals across Canada, Mexico, and The United States.

SECTION 1: THE PLANNING UNIT

A. Physical Features

The Allegheny Plateau physiographic area encompasses most of the highland portions of New York and Pennsylvania, with a small portion of northeastern Ohio (Fig. 1). It extends northward along the western base of the Adirondack Mountains and includes the Black and Mohawk river Valleys. In all, the planning unit spans a total area of 12,261,100 hectares (30,297,178 acres). It contains the southern portions of New York's glacially formed finger lakes and a total of roughly 57,000 hectares of lakes and rivers. Rock composition consists largely of sandstone, siltstone, shale and conglomerate with some limestone and coal (Crossley 1999). Much of the plateau finds its origin in erosion, though several regions, notably the finger lakes, have their origin in glacial erosion and deposition.

The principal mountains of the planning unit in New York are the Catskills and the northern extension of Appalachians, the Alleghenies. The Alleghenies reach 2500 ft. in New York and over 3000 ft. in the Pennsylvania portion. However, the highest peaks in this region are Slide Mt. at 4200 feet and Hunter Mt. at just over 4000 feet in New York's Catskills. Within the planning unit are 13 Ecological Units (Keys et al. 1995; Appendix 1).

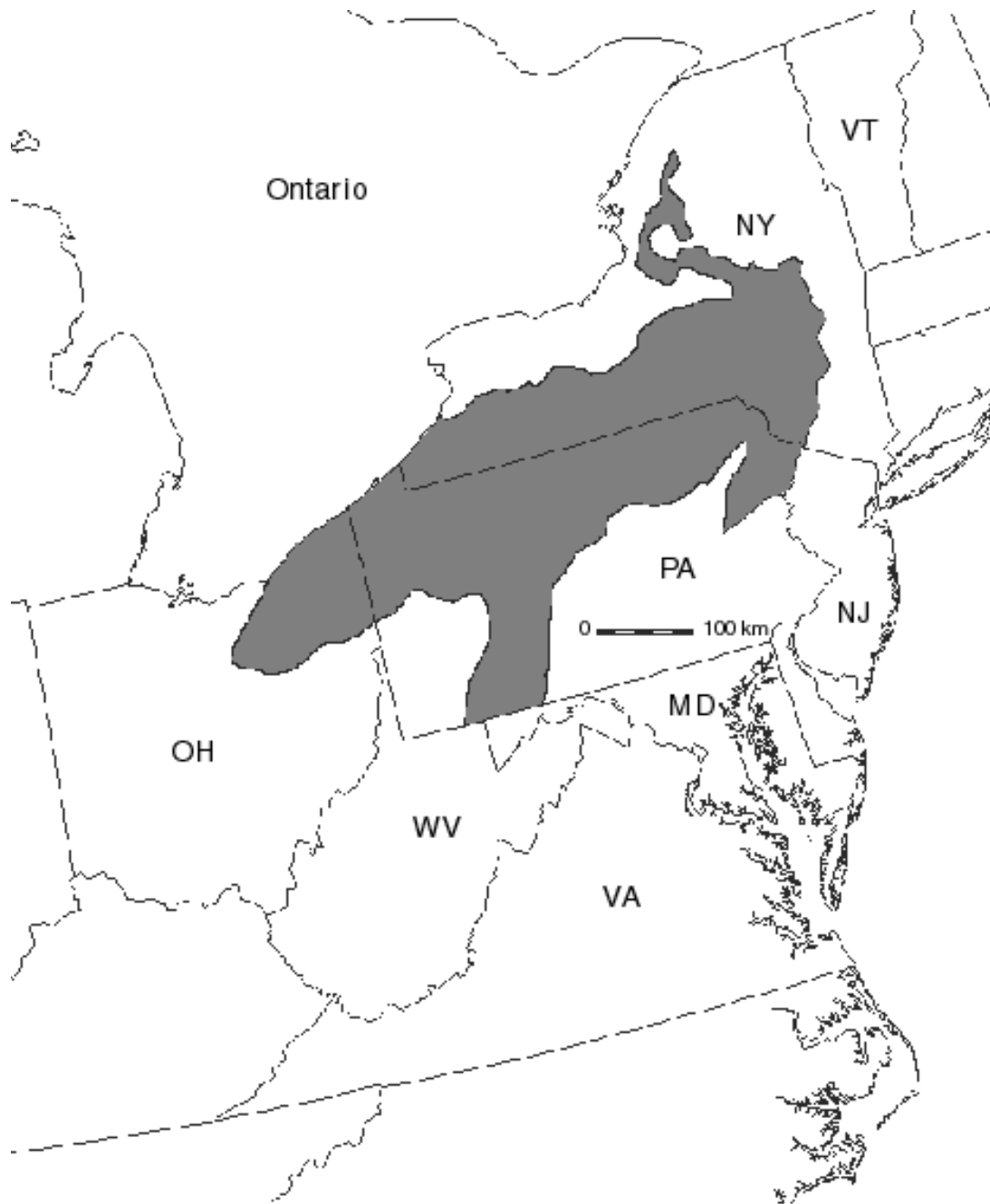
B Potential Vegetation:

The dominant habitat type of this region is temperate broadleaf and mixed forests and is demarcated from other regions in part by elevation. The three most dominant and widespread forest-tree associations in the region are the southern hardwoods (oak-hickory and formerly chestnut), the northern hardwoods (beech, birch and maple also hemlock) and drier oak-pine forests (Table 1.1; Fig. 2; Appendix 1). A small amount of spruce-fir forest occurs at higher elevations in the Catskill Mountains and in the Poconos of northeastern Pennsylvania (McWilliams and Brauning 2000). Today these forest types cover roughly 8 million ha (20 million ac), or 66% of the physiographic area (Table 1.1).

Table 1.1. Natural vegetation cover-types in the Allegheny Plateau physiographic area. Forest types are taken from USFS FIA data; nonforest types are from USGS data.

Vegetation type	Area (ha)	Area (ac)	% of area
Oak-hickory forest	3,332,200	8,233,866	27.2
Maple-beech-birch forest	4,353,000	10,756,263	35.5
Oak-pine forest	328,000	810,488	2.7
White-red-jack pine forest	217,600	537,690	1.8
Spruce-fir forest	600	1,483	0.01

Additional forest alliances that are not classified by USFS FIA data include hemlock-hardwood ravine forest, sugar maple-chinquapin oak forest, and sycamore-box-elder floodplain forest (Appendix 1). Nonforest alliances include pitch pine-scrub oak barrens and various wetlands, especially in the Finger Lakes region and along the shore of Lake Ontario. Locally, larch and white cedar are found often in association with bogs (Bull 1974).

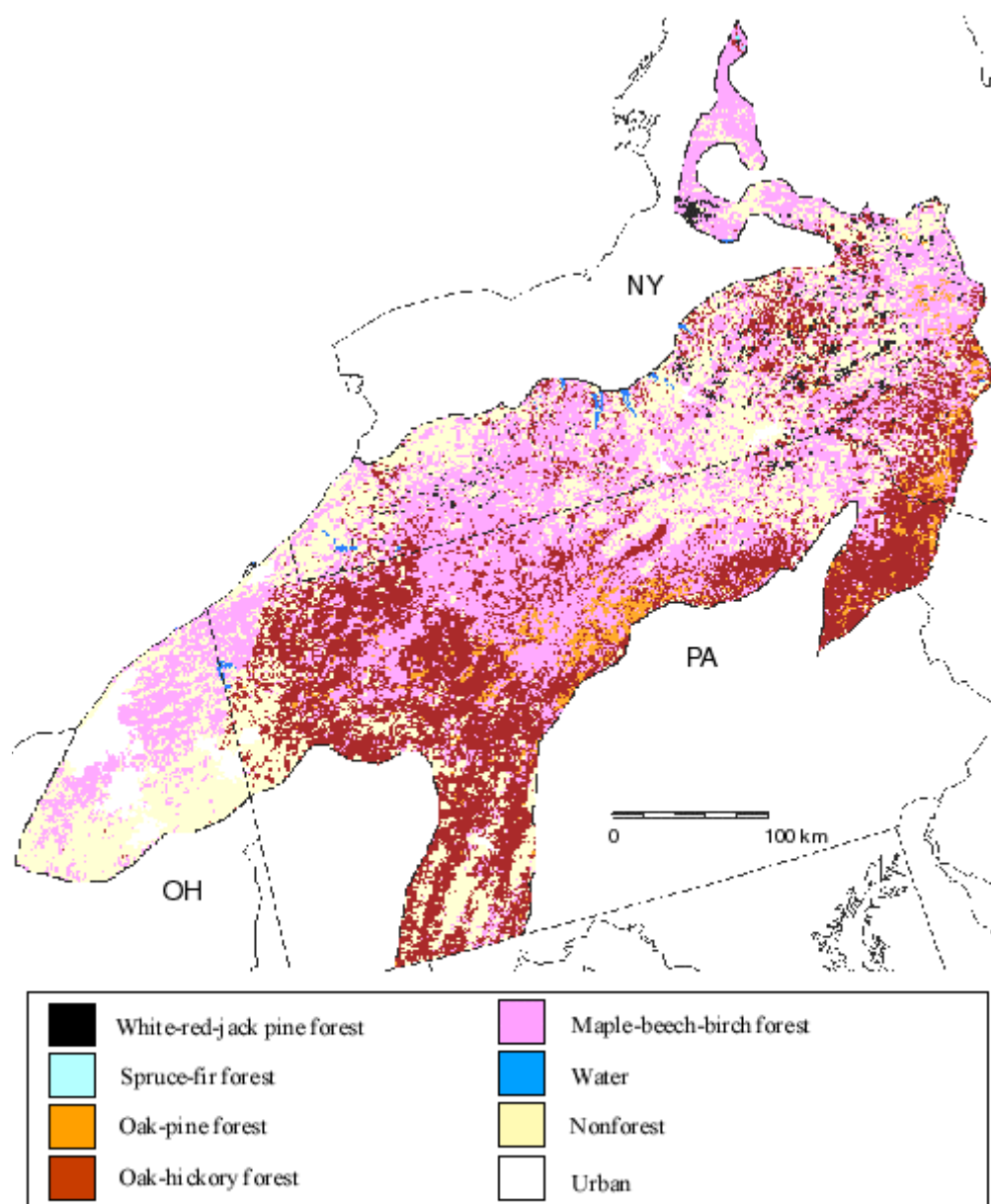


The Allegheny Plateau, physiographic area 24, covering 12,261,100 ha (30,297,178 ac) across Ohio, Pennsylvania, and New York.

Funding for the preparation of this map was provided by the National Fish and Wildlife Foundation, through a challenge grant to The Nature Conservancy, Wings of the Americas program. Matching funds for this grant were donated by Canon U.S.A., Inc.

Fig. 1.

Forest types in the Allegheny Plateau, physiographic area 24, from USFS FIA data



Funding for the preparation of this map was provided by the National Fish and Wildlife Foundation, through a challenge grant to The Nature Conservancy, Wings of the Americas program. Matching funds for this grant were donated by Canon U.S.A., Inc.

Fig. 2.

C. Natural disturbances:

Historically, fire likely played an important role in maintaining much of the oak-dominated forests of the southern portion of this planning unit, as well as the pine barren habitats throughout the area. Fire is an important factor in oak regeneration, and the fire suppression policies of the last half of the 20th century has had significant impacts on the natural processes and vegetation composition of deciduous forests and barrens. Insect outbreaks may also have had significant effect in the southern portions of the Allegheny Plateau. Gypsy moths and woolly adelgids are

examples of insect pests that are currently causing disturbances in natural forest communities (oaks and hemlocks, respectively). Weather events (e.g., hurricanes, tornadoes, ice and snow storms) probably played a more important role than fire in these areas. Pre-settlement forests were dominated by hemlock and beech, which may have composed up to 60% of these forests. Most currently occurring forestland, however, originated ca. 1890-1920, after logging cleared most of the planning area of timber (Ricketts et al 1999).

Other disturbance factors greatly affecting vegetative communities include the activity of mammals, most notably beaver and deer. The activity of beavers in this region may have played an enormous role in shaping the extent of grassland and shrubland habitat in the region. Heavy deer browsing plays an important role in understory structure, density and species composition. Entire classes of younger trees may be eliminated. Elimination of forest understory may drastically alter the bird communities by removing cover and nesting habitat.

D. History and land use:

In pre-colonial times much of the planning unit was covered with a vast and largely unbroken forest (Bull 1974). Most of this forest was logged during the 18th and early 19th century to provide lumber and to clear the land for agriculture. McWilliams and Brauning (2000) estimate that logging left Pennsylvania only about 25% forested by 1800. This radical reduction in the distribution and abundance of forests in the region from its precolonial composition must have had dramatic effects on the distribution and abundance of forest dwelling birds in the planning unit. Reforestation has been extensive in the past century, resulting in roughly two-thirds of the physiographic area being forested today (Table 1.2). Of this area, roughly 1.6 million ha. are publicly owned and managed; a majority of this is in an extensive network of state forests and parks in PA and NY. The Allegheny National Forest represents a large block of forested land in northern PA.

Table 1.2. Current land-use and ownership patterns in the Allegheny Plateau physiographic area. (number of hectares)

Land classification	Total area (ha)	Total area (ac)	% of region
Forested land	8,231,400	20,339,789	67.1
Public ownership	1,589,600	3,927,902	13.0
Federally managed	391,900	968,385	3.2
State managed	1,166,700	2,882,916	9.5
other public	6100	15,073	< 1
Private industrial	?		
Private non-industrial	?		
Other	24,900	61,527	0.2
Indian Reservation	24,900	61,527	0.2
Agricultural land	3,594,100	8,881,021	29.3
Other "grassland"	14,800	36,570	0.1
Residential/ developed	361,800	894,008	3.0
Freshwater wetlands /Water	57,900	143,071	0.5
Other nonforest lands	1,100	2,720	

The extent of agricultural land in Pennsylvania reached a peak of roughly 20 million acres by 1900, providing grassland species enough habitat that they were abundant nearly statewide. Abandonment of farmlands later in the century as settlers pushed for better farmland was responsible for a dramatic increases in shrublands and associated bird species as feral fields underwent succession. This massive farmland abandonment has led a wave of reforestation in the region sparking massive increases in secondary forest and subsequent widespread loss of grassland habitats. Today, roughly 4 million ha throughout the planning unit are in some form of agricultural production, mostly a combination of dairy farms and corn (Table 1.2).

Advances in farm equipment made cultivation of larger fields possible and decreased the acreage of hedgerows, increased the mowing and cutting frequencies and facilitated conversion of hayfields and pastures to high-intensity crops. The authors state that the landscape of Pennsylvania more closely resembles its appearance at the time of colonization than it has since, with forests covering approximately 59% of the land area. Widespread use of

pesticides such as chlorinated hydrocarbons (e.g. DDT) had tremendous impacts on birds of prey, as well as many other species, in the mid 1900s, but many of these populations have begun to recover.

Although urban development is not as rampant as in some other northeastern physiographic areas, several medium-sized cities exist here, including Erie, State College, Altoona, and Williamsport in PA, Binghamton, Ithaca, Elmira, and Jamestown in NY, and Cleveland, Akron, and Youngstown in northeastern Ohio. Suburban and other development around these and other small cities represents a significant threat to bird habitats in the region, especially for grassland and shrub-nesting species.

SECTION 2: PRIORITY BIRD SPECIES

A. General avifauna

Roughly 180 bird species have been documented as breeding within physiographic area 24 (Peterson 1985, various atlases). Of the nongame landbirds (143 species), the majority are migratory; these include 85 Neotropical migratory species. The landbird avifauna is typical of northern or boreal portions of North America, but includes many species of more southern affinity that are at the northern limits of their range. An analysis of all Neotropical migratory species in the Northeast U.S. (Rosenberg and Wells 1995) found the composition of breeding species in this area to be most similar to Northern New England and St. Lawrence Plain physiographic areas. From a global perspective, this physiographic area ranked moderately high in terms of immediate conservation concern, based on high atlas-block concentrations of regionally important species (Rosenberg and Wells 1995, 2000.)

Eleven species had >5% of their global population breeding within the planning unit (Appendix 2). These include several shrub-nesting species such as Blue-winged Warbler, Willow Flycatcher (eastern subspecies), and Gray Catbird, as well as deciduous forest species such as Scarlet Tanager, Wood Thrush, Louisiana Waterthrush, and Cerulean Warbler. These are species in the heart of their range, for which this physiographic area shares a high responsibility for their long-term sustainability. In addition, an unknown but significant population of Bicknell's Thrush occurs in the Catskill Mountains of New York.

Our primary measure of population trend at present is the Breeding Bird Survey (BBS), which provides data on roughly 145 of the 180 species breeding within Area-24 (N = 99 routes). For many species in this region, however, especially those of high-elevation or other patchily distributed habitats, BBS coverage is poor, and reported trends often lack statistical significance. Nevertheless, a significant declining trend for a species on existing BBS routes may be reason enough to examine the population trend more closely, and to initiate measures to halt or reverse this trend.

Of the species sampled by BBS, 41 have declined significantly ($P < 0.10$) since 1966, and 7 additional species have declined since 1980 (Appendix 2). Of the 48 declining species, 29 are associated with grassland or other early successional habitats, including urban areas. Species nesting in grassland habitats (e.g. Henslow's Sparrow, Vesper Sparrow, Horned Lark, Grasshopper Sparrow) are among the most steeply declining birds in this physiographic area (>7% per yr.). Early successional species associated shrubland and regenerating forest (e.g. Golden-winged Warbler, Yellow-breasted Chat, Brown Thrasher, Eastern Towhee, Field Sparrow) also form a suite of steeply declining species; American Woodcock and Whip-poor-will are also probably in this group.

Mature forest species that show particularly steep declining trends in this area include Worm-eating Warbler, Red-shouldered Hawk, Canada Warbler, and Wood Thrush, whereas several common species show smaller, but significant, long-term declines (e.g. Black-and-white Warbler, Great Crested Flycatcher, Scarlet Tanager). Other declining forest species are associated with either forest edges or openings (e.g. Eastern Wood Pewee, Yellow-shafted Flicker, Yellow- and Black-billed Cuckoo) or regenerating forests (e.g. Nashville Warbler, Least Flycatcher, Rose-breasted Grosbeak).

In contrast 38 species exhibited significantly increasing trends; 6 of these only show significant trends since 1980. As in other northeastern physiographic areas, species increasing the most are associated with human-altered habitats including urban wetlands (Canada Goose, Mallard), suburban backyards (Carolina Wren, Red-bellied Woodpecker,

House Finch), and conifer plantations (Yellow-rumped Warbler, Golden-crowned Kinglet, Hermit Thrush, Blue-headed Vireo). Several species of mature hardwood forest are also increasing in this region, indicative of steady rates of forest regeneration following agricultural abandonment (Yellow-bellied Sapsucker, Black-throated Blue Warbler, Hooded Warbler, Pileated Woodpecker).

B. Priority species pool

From among the breeding avifauna, a pool of species may be derived that represents priorities for conservation action within the physiographic area (Table 2.1). Note that a species may be considered a priority for several reasons, including global threats to the species, high concern for regional or local populations, or responsibility for conserving large or important populations of the species. The different reasons for priority status are represented by levels or tiers in the Table 2.1. Our primary means of identifying priority species is through the PIF species assessment process (Hunter et al. 1993, Carter et al. 2000) using scores generated by the Rocky Mountain Bird Observatory. This system assesses species on the basis of seven measures of conservation vulnerability. These include four global measures (i.e., they do not change from area to area), as well as threats to breeding populations (TB), area importance (AI), and population trend (PT), which are specific to each physiographic area. Categories of priority status are determined by examining combinations of parameter scores, as well as the total rank score, which is a measure of overall conservation priority. This process of species assessment has been standardized across all physiographic areas of North America. Scores for all breeding species in the Allegheny Plateau region may be found at: <http://www.rmbo.org/pif/pifdb.html>.

Note: The parameter scores for all physiographic areas in the Northeast were updated in August 2003 to reflect and be consistent with methods used in the *PIF North American Landbird Conservation Plan* (Rich et al. 2004). The priority species pool presented below reflects these updated scores and a revised set of entry levels (i.e., tiers). If you note changes in the priority species pool or individual scores from a previous version of this plan, they are likely due to the process of updating scores and entry levels to reflect the North American Plan.

There are six entry levels into the priority species pool, as follows:

Tier I. *High Continental Priority*. -- Species on the *PIF Continental Watch List*, which are typically of conservation concern throughout their range. These are species showing high vulnerability in a number of factors, expressed as any combination of high global parameter scores, with $AI \geq 2$ (so that species without manageable populations in the region are omitted). High level conservation attention warranted.

Tier IA. *High Continental Concern + High Regional Responsibility*. Species for which this region shares in major conservation responsibility; i.e., conservation in this region is critical to the overall health of this species. These species are on the *PIF Continental Concern List* with AI of 3 – 5 for this region, or a high percent population (above threshold in IIB).

Tier IB. *High Continental Concern + Low Regional Responsibility*. Species for which this region can contribute to rangewide conservation objectives where the species occurs. Species on the *PIF Continental Concern List* with AI of 2 for this region.

Tier II. *High Regional Priority*. Species that are of moderate continental priority (not on *Continental Watch List*), but are important to consider for conservation within a region because of various combinations of high parameter scores, as defined below; total of 7 parameter scores = ≥ 19 .

Tier IIA. *High Regional Concern*. Species that are experiencing declines in the core of their range and that require immediate conservation action to reverse or stabilize trends. These are species with a combination of high area importance and declining (or unknown) population trend; total of 7 parameters ≥ 19 , with $AI + PT \geq 8$.

Tier IIB. *High Regional Responsibility*. Species for which this region shares in the responsibility for long-term conservation, even if they are not currently declining or threatened. These are species of moderate overall priority with a disproportionately high percentage of their total population in the region; total of 7 parameters ≥ 19 , with $AI = 5$ or % population > threshold (see Appendix 3).

Tier IIC. *High Regional Threats*. Species of moderate overall priority that are uncommon in a region and whose remaining populations are threatened, usually because of extreme threats to sensitive habitats. These are

species with high breeding threats scores within the region (or in combination with high nonbreeding threats outside the region); total of 7 parameters ≥ 19 with TB + TN > 6 , or local TB or TN = 5.

Tier III. *Additional Federally Listed*. Species listed under the U.S. Endangered Species Act receive conservation attention wherever they occur.

Tier IV. *Additional State Listed*. - Species on state or provincial endangered, threatened, or special concern lists that did not meet any of above criteria. These often represent locally rare or peripheral populations.

Tier V. *Additional Stewardship Responsibility*. Representative or characteristic species for which the region supports a disproportionately high percentage of the world population (see Appendix), but which did not meet any of the above criteria. Includes moderate- and low-scoring species for which the region has long-term stewardship responsibility, even if these species are not of immediate conservation concern. These species are not included in the Table 2.1, but they can be found by reviewing the “% of population” numbers available at <http://www.rmbo.org/pif/pifdb.html>.

Tier VI. *Local concern* - species of justifiable local concern or interest. May represent a geographically variable population or be representative of a specific habitat or conservation concern.

Table 2.1. Priority species pool for Area 24. PIF regional and global scores from the PIF Species Assessment Database housed at Rocky Mountain Bird Observatory (Carter et al., 2000). Unless otherwise stated, percent of population calculated from percent of range area, weighted by BBS relative abundance (see Rosenberg and Wells (2000) and Appendix 3 in this document). See text for definition and interpretation of entry levels. Local status categories include species with breeding populations only (B) or species with at least part of the population found in the area year-round (R), and species reaching distributional limits (E). Species that are federally or state listed are noted on the Priority Species Pool by country and/or state using the following codes: E = Endangered, T = Threatened, SC = Special Concern.

Entry level	Species	Total score	% of pop.	AI	PT	Local status
<u>IA. High Continental Concern + High Regional Responsibility</u>						
	Henslow's Sparrow (NY-T, OH-E)	28	3.9	3	5	B
	American Woodcock	24	3.3	4	5	B
	Wood Thrush	23	6.2	4	5	B
	Canada Warbler (OH-E)	23	1.1	3	5	B
	Blue-winged Warbler	21	14.9	4	1	B
	Willow Flycatcher	19	??	4	3	B
<u>IB. High Continental Concern + Low Regional Responsibility</u>						
	Bicknell's Thrush (NY-SC)	28	??	2	3	B
	Golden-winged Warbler (NY-SC, OH-E)	26	2.1	2	5	B
	Cerulean Warbler (NY-SC, OH-SC)	25	5.2	2	4	B
	Worm-eating Warbler	24	1.0	2	5	B
	Upland Sandpiper (NY,PA-T)	21	< 1	2	3	B
	American Black Duck (OH-SC)	21	< 1	2	3	R
	King Rail (NY,OH-T; PA-E)	21	??	2	3	B
	Kentucky Warbler	21	< 1	2	3	B
	Red-headed Woodpecker (NY-SC)	20	< 1	2	4	R
	Short-eared Owl (NY-E, PA-E, OH-SC)	20	< 1	2	3	B
	Prairie Warbler	20	1.0	2	3	B
<u>IIA. High Regional Concern</u>						
	Scarlet Tanager	23	10.9	5	4	B
	Black-billed Cuckoo	22	4.5	5	5	B

Field Sparrow	20	3.6	4	5	B
Eastern Towhee	19	2.6	3	5	B
<i><u>IIB. High Regional Responsibility</u></i>					
Louisiana Waterthrush	22	6.1	4	2	B
Rose-breasted Grosbeak	19	4.9	5	2	B
<i><u>IIC. High Regional Threats</u></i>					
Sedge Wren (NY-T, PA-T, OH-SC)	20	< 1	2	3	B
Grasshopper Sparrow (NY-SC)	19	< 1	2	5	B
<i><u>IV. Additional State Listed</u></i>					
Yellow-bellied Flycatcher (PA-T)	19	< 1	2	3	B
Whip-poor-will (NY-SC)	19	< 1	2	3	B
Yellow-breasted Chat (NY-SC)	19	< 1	2	5	B
Northern Harrier (NY-T, OH-E, PA-SC)	18	< 1	2	4	R
Sharp-shinned Hawk (OH-SC)	18	2.3	5	3	R
American Bittern (NY-SC; PA,OH-E)	18	< 1	2	3	B
Black Tern (NY-E; PA,OH-E)	18	??	2	3	B
Northern Goshawk (NY-SC)	18	< 1	3	3	R
Red-shouldered Hawk (NY-SC)	18	< 1	2	5	R
Yellow-crowned Night Heron (PA-E, OH-T)	18	< 1	2	3	B
Long-eared Owl (OH-SC)	18	??	2	3	R
Marsh Wren (OH-SC)	17	0.1	2	3	B
Yellow-bellied Sapsucker (OH-E)	17	2.3	4	3	B
Virginia Rail (OH-SC)	17	< 1	2	3	B
Vesper Sparrow (NY-SC)	17	< 1	2	5	B
Northern Saw-whet Owl (OH-SC)	17	??	2	3	R
Barn Owl (OH-E, PA-SC)	16	??	2	3	B
Common Snipe (OH-SC)	16	< 1	2	3	B
Purple Martin (OH-SC)	15	< 1	2	3	B
Common Nighthawk (NY-SC)	15	< 1	2	3	B
Cooper's Hawk (NY-SC)	15	1.7	3	2	R
Horned Lark (NY-SC)	15	< 1	2	5	R
Northern Waterthrush (OH-SC)	14	< 1	2	3	B
Common Moorhen (OH-SC)	14	< 1	1	3	B
Common Tern (NY-T; PA,OH-E)	14	??	2	3	B
Magnolia Warbler (OH-SI)	13	< 1	2	1	B
Hermit Thrush (OH-T)	12	< 1	3	1	B
Dark-eyed Junco (OH-T)	12	< 1	3	1	R
Winter Wren (OH-SI)	11	< 1	2	1	B

Thirteen species are considered to be of high continental priority based on PIF scores (Table 2.1), with four additional species considered to be high priorities by other bird conservation initiatives (American Woodcock, Upland Sandpiper, King Rail, American Black Duck) meet the same PIF watch list criteria. Of these continental priority species, the Catskill Mountains population of Bicknell's Thrush is probably of greatest global significance. Golden-winged, Cerulean, and Worm-eating warblers are uncommon, but local populations of these species are also of high continental importance. The remaining species are more widespread and represent grassland, shrubland, and mature forest habitats, including Henslow's Sparrow, Wood Thrush, Canada Warbler, and American Woodcock.

The four species in tier IIA also show high regional importance due to a combination of large and declining populations in the physiographic area. These are species of shrubland and forest habitats. In tier IIB, Louisiana Waterthrush and Rose-breasted Grosbeak have disproportionately large populations in the area, but these species are stable or increasing; they are species for which the region shares the responsibility for long-term planning. Tier IIC contains 2 additional species with small breeding populations that are highly threatened within the physiographic area. These species highlight the need to protect sensitive and threatened grasslands habitats; note that these species are listed in at least one state.

A long list of 29 additional species are listed as endangered, threatened, or special concern in at least one state and have at least small breeding populations within the Allegheny Plateau. As elsewhere in the Northeast, state-listed species are dominated by raptors, wetland, and grassland species, most of which are considered rare or peripheral in the region and otherwise score relatively low in the PIF prioritization process. Conservation attention for these species, however, will often benefit other high-priority species in the same habitats. Note that a set of species on the Ohio state list are characteristic of northern forest and bog habitats, which are rare and threatened in that state.

The overall priority species pool of 54 species (30% of the breeding avifauna) includes many common species of forests, shrubland, and grassland habitats, many of which are declining in the Allegheny Plateau. Considering all factors, the species of highest conservation concern include Bicknell's Thrush, Henslow's Sparrow, Golden-winged Warbler, Cerulean Warbler, and a suite of mature-forest breeders. These may represent focal species that help define conservation actions in their respective habitats (see Section 4). The large group of state-listed species may represent local priorities that often highlight the need to conserve uncommon and fragile habitats within the largely forested landscape.

SECTION 3: BIRD CONSERVATION ISSUES AND OPPORTUNITIES

A. Early vs. late-successional habitats and species -- historical baselines

Because most of the Northeast region has undergone major changes in forest cover during the past two centuries, the relative importance placed on early- versus late-successional species and their habitats today depends in large part on the historical baseline chosen for comparison. This issue, which permeates bird-conservation planning throughout the Northeast, must be resolved before priority species and habitats are determined. The priority species pool for the Northern Ridge and Valley includes many species that are dependent on successional habitats, and the vast majority of these show declining population trends. The planning unit also supports many regionally and even globally important populations of forest birds, and in contrast, most populations of forest birds in this region appear stable or even increasing.

To some extent, deciding on the "value" of early-successional bird populations is subjective; for example, the fact that two of the species with significant declining trends in the region are European Starling and House Sparrow is hardly reason for concern. Other species such as Golden-winged Warbler, however, rank high in regional importance and their declines are a matter of great conservation concern. Similarly, American Woodcock is a species of regional and global concern that requires disturbed or managed habitats.

This plan recognizes the importance of mature-forest species in long-term conservation planning, but calls for a balance of maintaining naturally disturbed habitats as well as some early successional stages within the managed forest landscape. In addition, airports, reclaimed mines, and areas that are currently in agricultural production could be managed to benefit high-priority grassland species, thus maintaining the overall diversity of the avifauna.

B. Urban and recreational development on private land

Urban/suburban areas cover a relatively small portion (~3%) of the Allegheny Plateau planning unit. Perhaps the greatest threat from urbanization is the loss of agricultural land (especially dairy farms) around small and medium-sized cities. Subdivision of pastureland and large farms is particularly detrimental to area-sensitive grassland species, such as Upland Sandpiper and Henslow's Sparrow. Loss of shrubland habitats is also a major factor where development takes place in areas that were previously left fallow.

Although urban habitats are often thought of as non-habitat for most birds, several species in the priority pool for this unit are currently utilizing urban areas as one of their primary breeding habitat. Urbanization and lakeshore development was responsible for the extirpation of Piping Plover from its breeding range in the planning unit by 1973. In addition, because migration patterns tend to be concentrated along shoreline areas, several of the most heavily urbanized sections of this unit are located in extremely important migration stopover areas along the Lake

Erie shore. Municipal parks and even wooded neighborhoods can provide suitable stopover habitat that is critically needed by migrating landbirds.

C. Changing forest structure and forest health

The primary goal of this bird conservation plan is to ensure the long-term maintenance of all important forest types in the future landscape mosaic. This must be achieved through careful forest-planning on both private and public lands, with the goals of economic gains and sustainability balanced with the needs of birds and other wildlife. This balance will likely differ in areas of different land ownership. By taking a landscape perspective, we can take advantage of the opportunities in each area, such that the cumulative result will be to maintain healthy bird populations into the future.

At present, one of the most important disturbance factors affecting forested habitats in this region is the prevalence and spread of native and exotic insect pests and disease. Beginning with American chestnut blight, a series of such elements threaten the integrity and health of Appalachian forest ecosystems. These include gypsy moth, which stresses oak and other hardwood forests, dogwood anthracnose, hemlock woolly adelgid, and the complex of organisms attacking American beech, collectively referred to as beech bark disease. In addition, oak decline is a condition that further threatens dominant oak forests. Threats from these factors are particularly insidious, because in most cases, no effective control agents are currently known (SAA 1996, USFS 1996). [DEER overbrowse....need to expand]

D. Bird conservation opportunities and solutions

Several factors contribute to an optimistic assessment of future bird conservation planning in this region: (1) most priority bird species are still abundant and widespread, exemplifying the PIF objective of "keeping common birds common;" (2) an unprecedented level of dedication and cooperation exists among land-management agencies, private landowners, and conservation advocacy groups; and (3) many of the remaining sites important to breeding birds in this area are already under protection or appropriate land management practices by state and federal government agencies or conservation organizations.

Unlike many northeastern physiographic areas, the Allegheny Plateau includes large and significant areas of public lands, totaling over 1.5 million ha (3.9 million acres) or 13% of the planning unit. Most of these public lands are heavily forested, including the Catskill State Park and Forest Preserve (NY), Allegheny National Forest (PA), Allegany State Park (NY), and over 800,000 ha (2 million acres) of state forest land in both states. In addition, several critical areas in Ohio are designated as National Recreation Areas or Scenic Rivers. These vast public lands represent core areas where implementation of conservation objectives for high-priority bird species may be incorporated into other planning efforts.

State agencies and NGO's provide a number of specific programs for implementing bird conservation objectives in the Northern Ridge and Valley:

Important Bird Areas Program

Identification of Important Bird Areas within the New York, Pennsylvania and Ohio portions of this planning unit has recently been carried out by National Audubon Society's New York (Wells 1998), Pennsylvania (Crossley 1999) and Ohio (Ritzenthaler pers. comm) state offices. These include 30 sites in New York, 37 in Pennsylvania, and roughly 24 in the Ohio portion of the planning area (Appendix 4).

Conservation planning for these Important Bird Areas has begun and includes implementation of PIF plan objectives for high-priority landbirds. The IBA program in Ohio is still in the identification process, but 24 have been identified within the Allegheny Plateau physiographic area and may represent important sites for maintaining priority species in the region. Specific sites will be referred to in greater detail under appropriate habitat sections below.

How the Important Bird Area program fits into the Partners in Flight bird conservation planning and implementation process has not been fully resolved. The IBA program is not only targeted at protecting sites that are important to PIF priority species, but also protects areas that are important migratory habitat for many species, support large

numbers of particular species during the breeding or wintering seasons, provide habitat for birds listed as endangered, threatened or species of concern by state or federal agencies, sites that hold unique habitat types with characteristic bird life or sites that provide extraordinary opportunities for research or monitoring.

New York State Bird Conservation Areas

The Bird Conservation Area Program was established in 1997 by state legislation and is based on Important Bird Areas program work by the National Audubon Society of New York State. This legislation applies criteria for designating Bird Conservation Areas (BCAs) to state-owned lands and waters, and seeks to “safeguard and enhance” bird populations and their habitats on these areas. An area is designated as a BCA if it is found to be important habitat for one or more species. In general, a site is nominated because of its importance to large numbers of waterfowl, pelagic seabirds, shorebirds, wading birds, migratory birds, or because of high species diversity, importance to species at risk, or its importance as a bird research site.

The goal of the BCA Program is to provide a comprehensive, ecosystem approach to conserving birds and their habitats on state lands and waters, by integrating bird conservation interests in agency planning, management and research projects, within the context of agency missions. Further, the BCA Program will develop a process for designating BCAs and implementing programs to benefit bird populations, serving as models for other states, local governments and private landowners.

As of June, 2001, seven sites have been designated, but future additions will be made. Adminstrating the program is a small staff with the New York Department of Environmental Conservation, who can be contacted for more information.

Pennsylvania Natural Area Program

This program, a part of the Pennsylvania Bureau of State Parks, attempts to maintain certain areas within the state park system at a higher level of ecological integrity. A “natural area” is an area within a state park of unique scenic, geologic or ecological value which will be maintained in a natural condition by allowing physical and biological processes to operate, usually without direct human intervention. These areas are set aside to provide locations for scientific observation of natural systems, to protect examples of typical and unique plant and animal communities and to protect outstanding examples of natural interest and beauty. In areas of high recreational activity and in otherwise hostile or degraded landscapes these areas may provide significant benefits for priority birds by improving habitat quality and reducing disturbance.

Ducks Unlimited Wetland Programs

Ducks Unlimited is actively working on wetland restoration and protection throughout the Pennsylvania portion of the planning unit. Their Beyond the Bay Program focuses on improving water quality and restoring and enhancing key waterfowl migration and wintering habitats in the Chesapeake Bay watershed. Under this Initiative, DU along with its conservation partners, including the Chesapeake Bay Foundation, Pennsylvania Game Commission, USFWS, and Natural Resources Conservation Service, works with private landowners to restore wildlife habitat on their property. To date, the Initiative has completed 225 projects restoring over 800 acres of wetlands, 625 acres of upland buffers, and 60 miles of stream bank habitat.

In 1985, Ducks Unlimited initiated the MARSH (Matching Aid to Restore States Habitat) program to protect and enhance waterfowl habitat at the state level. The program is funded on a 7.5% reimbursement based on the state's chapter income. To date, the MARSH program has generated \$1,526,558 for cost share on waterfowl projects in Pennsylvania. The Pennsylvania Game Commission, U.S. Fish and Wildlife Service and other co- operators have contributed an additional \$4,817,834 to the future of waterfowl. Thus far, 377 projects have been completed, restoring and protecting more than 18,276 acres of wetland habitat in the state.

SECTION 4: PRIORITY HABITATS AND SUITES OF SPECIES

When species in the priority pool (Table 2.1) are sorted by habitat, the highest priority habitats and associated species can be identified (Table 4.1). These represent the habitats that are either in need of critical conservation

attention or are critical for long-term planning to conserve regionally important bird populations. The highest priority species do not form a cohesive habitat group, but rather separate among forest, agricultural grassland, early successional, and wetland habitats. The species of greatest concern, however, are early-successional and grassland habitat species, in particular Golden-winged Warbler and Henslow's Sparrow. Other habitats may be loosely ranked according to the highest-scoring species in the habitat suites. Within each habitat-species suite, certain species that represent particular limiting requirements (e.g., area sensitivity, snags) are considered focal species for setting population-habitat objectives and determining conservation actions and are identified in bold in each habitat section (sensu Lambeck 1997).

Table 4.1. Priority habitat-species suites for Allegheny Plateau. TB (threats breeding), AI (area importance), PT (population trend), and combined PIF scores from RMBO prioritization database (Carter et al. 2000). The focal species for each habitat are in bold type. Species are sorted according to action level and then combined score. Scale of Concern indicates whether a species is of continental (C) or regional (R) concern. State-listed species are not included in this analysis because they may not be of concern in all states within a region.

Habitat	Common Name	Scale of Concern	Action Level ^a	Combined Score	TB	AI	PT
<u>Shrub-early successional</u>							
	Golden-winged Warbler	C	IM, MO	26	4	2	5
	American Woodcock	C	MA	24	3	4	5
	Field Sparrow	R	MA	20	3	4	5
	Willow Flycatcher	C	MA	19	2	4	3
	Eastern Towhee	R	MA	19	3	3	5
	Blue-winged Warbler	C	PR	21	2	4	1
	Prairie Warbler	C	PR	20	3	2	3
<u>Agricultural grassland</u>							
	Henslow's Sparrow	C	IM, MO	28	4	3	5
	Upland Sandpiper	C	MA, MO	21	4	2	3
	Short-eared Owl	C	MA, MO	20	4	2	3
	Sedge Wren	R	MA, MO	20	4	2	3
	Grasshopper Sparrow	R	MA	19	4	2	5
<u>Riparian-deciduous (oak-hickory) forest</u>							
	Cerulean Warbler	C	MA, MO	25	4	2	4
	Worm-eating Warbler	C	MA	24	3	2	5
	Wood Thrush	C	MA	23	2	4	5
	Red-headed Woodpecker	C	MA	20	4	2	4
	Scarlet Tanager	R	PR	23	2	5	4
	Black-billed Cuckoo	R	PR	22	2	5	5
	Louisiana Waterthrush	R	PR	22	3	4	2
	Kentucky Warbler	C	PR	21	3	2	3
	Rose-breasted Grosbeak	R	PR	19	2	5	2
<u>Boreal mountaintop</u>							
	Bicknell's Thrush	C	IM, MO	28	3	2	3
<u>Northern hardwood-mixed forest</u>							
	Canada Warbler	C	MA	23	3	3	5
	Wood Thrush	C	MA	23	2	4	5
	Scarlet Tanager	R	PR	23	2	5	4
	Black-billed Cuckoo	R	PR	22	2	5	5
	Louisiana Waterthrush	R	PR	22	3	4	2

Rose-breasted Grosbeak	R	PR	19	2	5	2
<u>Freshwater wetland/lakes</u>						
American Black Duck	C	MA	21	4	2	3
King Rail	C	MA, MO	21	4	2	3

a Action levels: IM = immediate management or policy needed to prevent regional extirpation; MA = management or other actions needed to reverse or stabilize declining populations or reduce threats ($TB + PT \geq 7$); PR = long-term planning and responsibility to ensure stable populations ($TB + PT < 7$); MO = additional monitoring needed to better understand status or population trends.

A. Shrub-early Successional

Importance and conservation status: Human-influenced shrubland represents a significant portion of this habitat in the planning unit, although exact acreages are not known. Naturally occurring shrublands also occur in association with Pitch Pine/Scrub Oak woodland over well-drained soils, and these communities may well represent the original habitat used by many early successional bird species. These areas are typically fire-dependant and following fires would have been suitable habitat for this suite of species. Shrub/early successional habitat may be especially short-lived in logged over areas and longer lasting in agricultural sites.

Wetter sites also provide habitat for early successional species. With stable water levels, edges of some emergent marshes are often "fringed" with shrubs creating a habitat transition into surrounding uplands. Many bird species use these edge habitats and their territories often encompass patches of forested wetland where tree species are stunted and are structurally similar to shrub-dominated sites. Historically, beaver populations have greatly influence these sites. Some shrub habitat is lost as beavers flood alder-dominated riparian areas. When forested habitats are flooded, trees are killed, but these sites readily revert to shrubland habitat if followed with prolonged abandonment by beavers. Beaver meadows and impacted areas are, by one source, estimated to have altered up to 1/3 of the land area of New York state (Confer pers comm).

Just as disturbances such as beaver activity, fire, and wind and ice storms maintained grasslands in the pre-colonial landscape, succession of these areas perpetuated the presence of shrub dominated habitats in the northeastern United States. In the Northeast, approximately 50% of the bird species and almost 60% of mammal species rely on a combination of early, mid and late-successional stands (Scanlon 1992).

Today, early successional habitats and shrubland are primarily the result of regeneration following logging activity and by abandonment of agricultural fields. Without management and given enough time, most early successional habitat in this region will revert to forest. The extensive reforestation and subsequent loss of early successional habitat in the Allegheny Plateau is a major factor responsible for the slow disappearance of the Golden-winged Warbler from the region and the decline of many species in this habitat suite. Habitat loss to urbanization and successional processes have been especially evident in the Northeast. In just ten years (late 1960s-70s) along woodcock survey routes in all northeastern states combined, the availability of abandoned and active fields declined by 23- 25%, whereas the amount of land in young forest increased by 63% and that in urban/industrial uses increased by 33% (Dwyer et al. 1983 from Gibbs et al. 1999).

Interestingly, significant amounts of habitat for this group of birds exists along power-line and pipeline corridors (Litvaitis 1999). Although, not all corridors in the planning unit are managed equally; some are maintained with little shrub and tree growth and others are allowed to develop robust stands of deciduous shrubs. How these sites are managed is extremely important and determines the amount and structure of the habitat that occurs there.

Restoration of shrubland habitat on a such a large is scale is daunting. Litvaitis et al (1999) state that even if we were able to the estimate presettlement acreage of early-successional habitat in the Northeast, it may not be sufficient to support populations of early-successional species in the landscape today. Because the habitat matrix that surrounds early-successional habitat today is vastly different, including networks of roads and other non-habitats, the ability of early-successional species to disperse and move between patches is hampered. It may also be that the habitat suitability of shrubland patches are altered by surrounding land-use. Unlike grassland and forest-interior bird species, many of which are notoriously sensitive to fragmentation and will not reproduce in small patches of habitat,

shrubland birds may thrive in small habitat patches. This relative insensitivity may reflect the historic distribution of shrub habitat as more isolated patches in a mosaic of forest encroaching on disturbed areas (Confer pers. comm).

Associated priority species: GOLDEN-WINGEDWARBLER, AMERICAN WOODCOCK, Field Sparrow, Blue-winged Warbler, Prairie Warbler, Whip-poor-will, Yellow-breasted Chat, Eastern Towhee, Common Nighthawk.

Habitats used by these species most frequently result from disturbances such as fire, timber harvesting or abandonment of agricultural lands or as a result of utility corridor if vegetation is allowed to develop a dense shrub cover (Confer 1992, Richardson and Brauning 1995). Many of these priority species favor wetter shrubby habitats (Confer 1992, Richardson and Brauning 1995).

As with grassland-dependent species that are experiencing habitat loss and that also depend upon periodic disturbance to maintain and create habitat, many shrubland-dependent species are declining in this region. Whip-poor-will (-11.7%), Golden-winged Warbler (-7.8%), Yellow-breasted Chat (-5.7%), Field Sparrow (-4.1%) and Eastern Towhee (-4.0%) are all showing drastic, statistically significant declines (see also Appendix 2).

Golden-winged Warbler is listed as a species of Special Concern in New York and Ohio. Golden-winged were found in 10%, 11% and 1% of atlas block in the states of New York, Pennsylvania and Ohio respectively during the state breeding bird atlases in the late 1980's. The steep yearly declines in these species has surely affected populations in this region since that time. From 1999-2002, the Golden-winged Warbler Atlas Project will attempt to determine the present-day status of this species throughout its range. Results will likely indicate massive declines of Golden-winged Warbler in this region and illustrate the northward shifting distribution of this species and the Blue-winged Warbler. Golden-winged Warbler is well-documented to be in decline throughout its overall breeding range (Confer 1992). Confer (1992) also noted that Golden-winged Warblers include a portion of forested edge in their territories and that this species is frequently absent from many sites which appear to have suitable habitat.

American Woodcock was found to be distributed rather uniformly within the physiographic area, according to regional breeding bird atlas projects (roughly 30% of blocks overall). Although the BBS does not adequately sample this largely nocturnal species, a non-significant decline of 4.6% per year since 1966 is noted, and singing-route surveys also indicate a non-significant decline of 2-3% per year since 1966 in most of the region. Yellow-breasted Chat, Whip-poor-will and Common Nighthawk are all listed as species of Special Concern in New York State and have declined sharply in recent decades. Field Sparrow, Blue-winged Warbler, and Eastern Towhee are all still relatively abundant and widespread, but are declining at similarly steep rates.

Because of their diverse habitat requirements, these species probably do not constitute a "habitat-species suite" per se. Listing them together, however, highlights the need to include early successional habitats in the conservation plan, where doing so is not in conflict with higher-priority forest-bird objectives.

Habitat and population objectives: Based on extrapolations from BBS relative abundances, VERY ROUGH estimates of population size for priority species in this habitat suite can be derived (Table 4.3). These crude estimates are most useful in illustrating the relative population sizes of various species and, perhaps, giving order-of-magnitude figures for setting population objectives for the region. Note that Breeding Bird Atlas data for these three states is 1-2 decades old; therefore, while the relative abundance and distribution for many species may be similar today, the current abundance of Golden-winged Warbler in the Allegheny Plateau is certainly much lower, and its distribution far more restricted.

For species that have declined significantly during the BBS period, a population target may be set to approximate pre-BBS population levels; an annual decline of 2.4% per year corresponds with a 50% loss over 30 years. For species suffering a 50% or greater loss since 1966, this plan calls for roughly a doubling of present-day populations as a practical objective. For species showing stable or unknown trends, population targets are roughly rounded up from current population estimates. Note that the relative abundances used to for these estimates are averages across all BBS routes in the physiographic area using data from 1990-1998. For more details on methods used for calculating populations and targets, (see Appendix 3).

Table 4.3. Population estimates and targets (number of pairs) for priority species of shrubland and early successional habitats in the Allegheny Plateau physiographic area. Percent of Atlas blocks based on number of 5-km blocks in which the species was reported (from Rosenberg and Wells 1995, appendix 3).

Species	BBS population	% lost Since 1966	Population target	% Atlas blocks		
				NY	PA	OH
Golden-winged Warbler	4,300	> 50%	8,500	10	11	1
American Woodcock	??	> 50%	??	28	21	44
Field Sparrow	137,000	> 50%	275,000	95	83	100
Blue-winged Warbler	64,000	increasing	65,000	45	24	87
Prairie Warbler	5,400	stable	5,500	15	12	20
Eastern Towhee	113,000	> 50%	225,000	95	90	99

OBJECTIVE 1. Encourage and enhance population expansion of Golden-winged Warbler by maintaining known breeding sites in suitable habitat condition and replicating these conditions wherever feasible; strive to maintain long-term population of 8,500 breeding pairs.

OBJECTIVE 2. Maintain stable breeding population of (????) American Woodcock throughout the physiographic area as measured by a mean of ?? singing males per Singing Ground Survey route; maintain or increase current distribution among atlas blocks in all 3 states.

OBJECTIVE 3. Stabilize or reverse declining population trend for other common shrub-nesting species, maintaining long-term populations of 275,000 pairs of Field Sparrows and 225,000 pairs of Eastern Towhees.

Based on published densities, roughly 260,000 ha of disturbed or shrubby habitat is required to support the entire habitat-species suite (e.g. 275,000 pairs of Field Sparrows); of this, 18,000 ha should be suitable to support 8,500 pairs of Golden-winged Warblers.

Implementation strategy: Conserving populations of early successional species will require a combination of tracking changes in abundance of natural, early successional communities as well as active management to maintain early successional conditions. Development of best management practices for utility corridors might minimize use of herbicides to control woody plants and allow for sufficient growth to be suitable for some members of this suite of species.

Important components of an implementation strategy should include:

- outreach targeted at both professional and private audiences (see "*Outreach*");
- identification and protection of naturally occurring shrub or barrens habitat and potentially designating these as Important Bird Areas;
- aggressive management to protect existing sites used by breeding Golden-winged Warblers, including activities to minimize competition with Blue-winged Warblers;
- improved monitoring for species that show long-term declines especially at the state level;
- building partnerships with utility operators for maintenance of shrubby conditions along powerlines and other corridors;
- building volunteer network for monitoring of shrub (and forest) birds along utility corridors (perhaps using mountain bikes).

Implementing conservation for this group of birds may at times be at odds with conserving grassland-dependant species. However, the majority of habitat for both species will not be maintained without human intervention. This contradiction needs to be recognized in view of the greater area sensitivity shown by many grassland birds. Although the scrubby fringe that often accompanies grassland habitats, especially abandoned fields, may support shrub-nesting species, enlarging patches of grassland habitats may be desirable at the expense of habitat for shrubland associated species if the vegetation community and the bird species there are sufficiently common to justify such a strategy.

Furthermore, maintaining shrubland species in primarily forested landscapes may be possible without causing many of the negative effects of fragmentation that affect forest dwelling species. This is because shrub species can take advantage of small habitat patches distributed throughout the forested matrix. For example, a narrow power-line corridor extending through a forested landscape may support large numbers of shrub-nesting birds without reducing suitability of the region to forest-breeding species.

A good list of landowner incentive programs are listed in Appendix 4 of this report and is separated out by habitat type. Landowners and managers can reference this section to locate programs that will help promote bird conservation through habitat acquisition and management and other conservation measures.

Important Bird Areas

Several Important Bird Areas that have been identified in the planning area contain important shrub-early successional habitat and will be an important focus for implementation phase of the PIF conservation plans. As a part of the IBA designation process, conservation strategies for these sites will be produced. Important sites for shrub and early-successional birds are (Wells 1998, Crossley 1999):

New York

- Hemlock and Canadice Lakes-38,400 acres; Mostly private. Significant shrub/scrub. Breeding species include Golden-winged Warbler.
- Hi-Tor Wildlife Management Area-6,100 acres; Public (NY DEC). Some shrub/scrub habitat. Carolina Wren, Brown Thrasher, Blue-winged Warbler, Chestnut-sided Warbler, Indigo Bunting, Field Sparrow and Orchard Oriole.
- Letchworth State Park-14,342 acres; Public (state and federal). 30% shrub/scrub. Breeding species include Golden-winged Warbler (5 pr. in 1996), Yellow-breasted Chat (SC) 10 pairs, 1995 and a large winter roost of Turkey Vultures.

Pennsylvania

- Cook Forest State Park-6,668 Acres; Public (PA Dept. Cons. Nat. Res.). Old-growth forest, dominant second-growth mixed forests and riparian flora. Species include Whip-poor-will.
- Cussewago Bottom-4,200 Acres; Public (PA Game Commission). Mostly bottomland forest and wetlands, but some early successional species. Species include Golden-winged and Prairie Warbler.
- Long Pond Preserve, Barrens-15,000 Acres; Public (PA Game Commission)/ Private. Conifer plantations, upland forest areas of maple, oak and chestnut. Dry and wet barrens. Species include Golden-winged Warbler, Eastern Towhee, Prairie Warbler, Whip-poor-will, and Alder Flycatcher.
- Marsh Creek Wetlands – “The Muck”-1,000 Acres; Public (PA Game Comm.) /Private. Forested, scrub/shrub wetlands, emergent marsh, aquatic bed and unconsolidated wetlands. Site is important for breeding Alder Flycatcher (6+ pairs) and wintering Northern Harrier.
- Pine Creek Gorge Natural Area-12,600 Acres; Public (Dept. Cons. Nat. Res.). Red and white oak, northern hardwoods, white pine and hemlock. Breeders include Common Nighthawk, Northern Harrier (and wintering birds).
- Quehanna Wild Area-50,000 Acres; Public (PA Dept. Cons & Nat. Res.) -Expansive forests-wide variety of age classes and forest types. Species include Prairie Warbler, Whip-poor-will Chestnut-sided Warbler and Indigo Bunting.

- Roderick Wildlife Preserve-SGL 314-3, 131 Acres; Public (PA Game Commission). The combination of wetlands, second growth and dense thickets make this one of the most important sites in the state for American Woodcock with 50+ breeding pairs.
- Southern Sproul State Forest-100,000 Acres; Public (Dept. Cons. & Nat. Res.). A large, remote northern hardwood forest-mild, mixed forest types. Species include Prairie Warbler, Whip-poor-will, Eastern Bluebird, Chestnut-sided Warbler and Eastern Towhee.
- Tamarack Swamp-300+ Acres. Public (PA Dept. Cons. & Nat. Res.)/ Private. Hemlock, spruces and balsams and boreal swamp. Species include Whip-poor-will, Golden-winged Warbler and American Woodcock.
- Youghiogheny Valley, Ohiopyle State Park-19,000 Acres; Public (Dept. Cons. & Nat. Res.). Mixed deciduous forest and open meadows. Species include Golden-winged Warbler, Pine and Chestnut-sided Warbler.

Ohio

Many Important Bird Areas in Ohio have been nominated, but information on species present and habitat are currently unavailable (Table 3.3).

Management Recommendations: The decline in numbers of many early successional species, including the Golden-winged Warbler, are associated with loss of breeding habitat caused by reforestation, intensive agricultural use and urban/suburban development.

Litvaitis et al. (in press) suggest that management recommendations for shrubland birds will differ based on the landscape context. In more forested regions they recommend management by a “shifting mosaic” model that will mirror a natural disturbance pattern by providing for several small patches and a few large patches of shrub. In more modified landscapes they recommend consolidation of existing patches, including powerline corridors. Clustering patches would facilitate movement of birds between patches, and would be more likely to safeguard against local extinctions according to metapopulation theory.

Habitat requirements for focal species in this habitat suite are similar, and there is over lap in management recommendations between species. In particular, management practices for American Woodcock, the only priority early-successional species that is currently managed for by wildlife agencies, have benefits for Golden-winged Warbler populations (Confer pers. comm).

GOLDEN-WINGED WARBLER

Golden-winged Warbler populations have shown drastic declines in this region in the past several decades. Reforestation of abandoned farmland in this region has been a significant factor in the steady declines. Several other factors may contribute such as competition with the Blue-winged Warbler, nest parasitism by cowbirds and possibly loss of winter habitat (Confer et al. 1999). The ability of this species to recolonize areas where Blue-winged Warblers have subsequently expanded their range is unknown. Confer (1992) also noted that Golden-winged Warblers include a portion of forested edge in their territories and that this species is frequently absent from sites which appear to have suitable habitat.

Habitat tracts of 10-15 ha can support several pairs and are preferred over both smaller and larger areas (Confer 1992). Confer et al. (1999) recommends management for this species that includes three elements, 1) creation or maintenance of sufficient amounts of habitat, 2) a management program that assesses the impact of Blue-winged Warblers and Brown-headed Cowbirds and potential need for control measures and 3) the effect of winter habitat loss and needs. Breeding habitat can be created through succession following farming and certain logging techniques. Optimal management for this species includes rotational burning or intermittent farming with a cycle of roughly 40 years that allows for roughly 25% of a managed area to be burned once every 10 years. Successional habitat for Golden-winged Warblers typically only remains suitable for 10-20 years and will take approximately half that to initially become suitable. Succession in adjacent areas will provide the forest edge that is apparently a requirement of this species (Confer et al. 1999).

In the Allegheny Plateau region, no areas exist that are outside the range of Blue-winged Warbler, a species which competes with and hybridizes with Golden-winged Warblers. In this area of overlap, locating sites where both

species coexist, determining possible habitat segregation, and identifying conditions which may favor persistence of Golden-wings (e.g. higher elevations, wetter conditions) will be critical for the survival of this species.

AMERICAN WOODCOCK

American Woodcock require a mix of habitats, including forest openings or clearings for singing displays in spring, alder or other young hardwoods on moist soils for feeding and daytime cover, young second-growth hardwoods for nesting, and large fields for night-time roosts (Mendall and Aldous 1943; Connor, in Andrle and Carroll 1988). Although there have been many studies of seasonal habitat use, the relationship between specific habitat features and population demography remain unknown (Keppie and Whiting 1994). Silvicultural practices can enhance habitat available for woodcocks (Sepik et al. 1981), although a shift away from even-aged management (creating large areas of uniform shrub cover) may be detrimental to populations (Keppie and Whiting 1994). Management for American Woodcock may also provide habitat for Golden-winged Warbler (Confer pers. comm.).

FIELD SPARROW

In most regions and habitats Field Sparrows require at >2 ha (Sousa 1983), but territory sizes range from 0.3 to 2.4 ha (Walkinshaw 1945, 1968, 1978; Crooks 1948; Best 1977; Evans 1978; Laubach 1984). Management practices that completely remove woody vegetation will not benefit this species (Best 1979, Stauffer and Best 1980). Disturbance, such as burning, should be avoided before territories have been established, approximately March to early April (Best 1979, Carey et al. 1994, Herkert 1994b). Burning Field Sparrow habitat while it is occupied by the birds will cause Field Sparrows to abandon their territories (Best 1979, Carey et al. 1994). Similarly to the recommendations for Golden-winged Warbler, small, isolated habitat fragments should not have more than 50-60% of total area burned at a time, and where several small fragments are present, a rotating schedule also can be implemented to provide adjacent burned and unburned areas (Herkert 1994a). On larger fragments (>80 ha) burning should be conducted on a rotating schedule with 20-30% of area treated annually (Herkert 1994a).

Resources

The proceedings of several major conferences and groups have been published and offer major insights into the management of Neotropical migratory birds, and especially forest species (Martin and Finch 1995, Finch and Stangel 1993, Hagan and Johnson 1992). DeGraff and Rudis (1986) and DeGraff et al. (1992) are specific to the Northeast. Maryland PIF (1997) provides specific habitat management recommendations for shrub/scrub species.

Species-specific management recommendations are available online through the Nature Conservancy's Wings of the Americas website. They provide links to additional species management information available from the Northern Prairie Wildlife Research Center of the U.S. Geological Survey, Biological Resources Division, the Army Corps of Engineers, Waterways Experiment station, and the Wilderness Society's (TWS) Migratory Bird Initiative. They also reference the appropriate publication number for the Birds of North America series and provide links or contact information maintained by Partners in Flight to species accounts developed by the US Fish and Wildlife Service.

Wings Info Resources / Species Information and Management Abstracts:

<http://www.tnc.org/wings/wingresource/birddata.htm>

Research and monitoring needs: Within the planning unit, populations of only 4 of the 10 priority species within this habitat appear adequately monitored by the BBS. American Woodcock, Whip-poor-wills, and Common Nighthawk, all primarily nocturnal species, are underreported on the BBS, compared with Breeding Bird Atlas results. In addition, Golden-winged Warbler is at present so rare that BBS monitoring is no longer adequate. From 1999-2002, the Golden-Winged Warbler Atlas Project is attempting to identify current breeding sites for this species, as well as the range of habitats occupied and areas of coexistence and persistence with Blue-winged Warblers.

Monitoring programs at Important Bird Areas are in the planning stages for several state programs. They will begin after an inventory has been taken and will be carried out by volunteers. These efforts may or may not well cover Partners in Flight priority species, but rather will be targeted at species within the IBA that met criteria in identification of the IBA. For example, small shrublands part of a large wetland complex harboring large populations of wintering waterfowl lack priority where manpower is low.

Basic research on the biology of high priority species in this suite is warranted especially for the Golden-winged Warbler. Ecological studies of Golden-winged Warblers on their wintering grounds is especially important. Specific needs on the breeding grounds include:

- determine range of suitable habitats and identify present breeding sites for Golden-winged Warbler in this region;
- develop improved monitoring program for Golden-winged Warbler that considers their patchy distribution and low population size;
- designate sites where significant populations of Golden-winged Warblers occur as Important Bird Areas and encourage monitoring programs at these sites;

In addition, general research and monitoring needs for this habitat include:

- compare early successional habitats resulting from natural disturbances vs. forestry practices with regard to suitability for high-priority species;
- determine effects of woodcock habitat management techniques on other priority, early-successional bird species;
- What are the regional patterns in lands use, relative to early successional habitats?
- Specific recommendations about burning regimes?

Outreach: This group of species, with the exception of American Woodcock is largely overlooked by professional agency biologists and managers. Considerable attention has focused on the decline of American Woodcock populations and where management programs have been introduced for this species other birds of early successional habitats have likely benefited. Recently, awareness of habitat loss for early successional species has broadened to include nongame birds. Consequently, attention, especially by conservationists, has been focused on grassland birds.

There appears to be overwhelming evidence that habitat loss, either through reforestation of abandoned agricultural land or degradation of habitat quality through increased residential development, is certainly an important contributor to the decline of these species in this region.

One of the greatest challenges ahead in dealing with the decline of early-successional habitat and associated bird species is convincing the public that action is needed that such efforts are not contradictory to maintaining diverse ecosystems (Litvaitis et al. in press). Important components of a public (and professional) outreach message would include:

- many species using this habitat type are in decline.
- shrubland-associated species are not typically sensitive to patch size, unlike grassland birds; therefore, even efforts on small properties can effect local populations.
- The origin of much of this habitat in the Allegheny Plateau is via human disturbance either through forestry practices or former agricultural land.
- suitable habitat for some species exists in such heavily managed systems as utility corridors.
- periodic disturbances, either mechanical or fire for example, are important if persistence of this habitat type is desired over long periods of time.

B. Agricultural Grassland

Importance and conservation status: Debate over the whether native grasslands were a historically significant part of the northeastern landscape has tempered conservation efforts targeting grassland birds. But arguments that the major declines in populations of grassland birds in this region due to reforestation are simply a return to the very low levels of grassland birds that occupied the region in precolonial times are not entirely founded. While it is clear that some grassland species expanded their ranges into the Northeast following the extensive felling of forestland and agricultural conversion of early America, grasslands were not absent from the region before this time.

There is evidence to show that large, scattered, native grassland existed in the northeastern United States in pre-colonial times (Day 1953, Marks et al 1992, Patterson and Sassman 1988, Askins 1997, Mehrhoff 1997, Vickery and Dunwiddie 1997). Perhaps the most compelling of this evidence is the existence of many subspecies of grassland birds native to the region such as the Heath Hen, (Ipswich) Savannah Sparrow, and eastern subspecies of Henslow's

Sparrow (*A.h. susurrans*) (Askins 1993, 1997). Natural fires and those set by Native Americans (Zaremba and Hubbs 1991, Tyndal 1992, Vickery and Dunwiddie 1997), beaver activity, ice and wind storms are all significant disturbances that contributed to the persistence of grassland habitat in the Northeast.

Unfortunately, the presettlement extent of natural grasslands in the Allegheny Plateau and throughout the Northeast is unknown (Vickery and Dunwiddie 1997, Askins 1997), making determination of the historical importance of grassland habitat in this region difficult. However, Askins (1997) and Bollinger (1991) argue that destruction of the Great Plains, which once harbored the largest numbers of grassland birds in North America, gives added importance to populations in the Northeast, making them a “more significant component of the entire, continent-wide population.” Certainly, the importance of grasslands in the Allegheny Plateau to continent-wide populations of some grassland species is significant.

As of 1998, there were roughly 14,800 ha classified as bluestem, grama and wheatgrass grasslands in the Allegheny Plateau (USFS FIAA data). Another 943,100 ha were classified as pasture, hay, mixed crops or wheat and small grain crops. Total agricultural land comprised 3,494,100 ha, approximately 30% of the landscape (see Table 1.2). Native grasslands comprised less than one tenth of one percent of the total land area.

Changing agricultural practices and development are threatening remaining grasslands in the region. Most birds require large, contiguous patches of grassland to breed successfully. In particular, loss of dairy farming due to economic factors is resulting in loss of productive pastureland that supports many grassland-nesting species. In some areas, airports and military bases provide the best remaining habitat. Land management that regulates the frequency and type of disturbance to grassland will play a huge role in the maintenance of existing grasslands, the restoration of unmanaged areas, and the creation of new habitat in the planning unit.

Associated priority species: HENSLOW’S SPARROW, UPLAND SANDPIPER, GRASSHOPPER SPARROW, Sedge Wren, American Kestrel, Northern Harrier, Short-eared Owl, Bobolink, Barn Owl, Vesper Sparrow, Horned Lark, Purple Martin.

A high proportion of the declining species in this region are associated with grasslands. Henslow's Sparrow (12.7%), Grasshopper Sparrow (-7.2%), Vesper Sparrow (-9.2%), Horned Lark (-7.3%) and Eastern Meadowlark (-5.1) are all declining at alarming yearly rates (BBS 1966-1999). Several species are found on state endangered species lists: Northern Harrier (NY-Threatened, OH-Threatened), Upland Sandpiper (NY-Threatened, PA-Threatened, OH-Threatened), Grasshopper Sparrow (NY-Species of Concern), Horned Lark (NY-Species of Concern) and Vesper Sparrow (NY-Species of Concern). In addition to Henslow’s Sparrow and Upland Sandpiper, Northern Harrier and Short-eared Owl were identified by Schneider and Pence (1992) as nongame species of management concern in the Northeast. No birds associated with grasslands are increasing in this physiographic area.

Henslow’s Sparrow is a historic breeder throughout New York and central New England (Smith 1988, Boone and Dowell 1996). Breeding activity in the Northeast is uncommon and local (Veit and Petersen 1993, Smith 1992). The species historically expanded its range in the region as forests in the Northeast were cleared for agriculture (Boone and Dowell 1996, Smith 1997) and it is possible that the sparrows are still more abundant today than in the early 1900's (Smith 1997). Henslow’s Sparrow is identified by the US Fish and Wildlife Service as a migratory nongame bird of management concern in the Northeast (Smith 1992), and it is listed as endangered or threatened in at least 6 states in the Northeast. The roughly 4% of the world population of this species that is found in the Allegheny Plateau is declining at a precipitous 12.7% per year. This species still breeds in pockets of the southern Finger Lakes region and southern tier of New York and on reclaimed strip mines in Pennsylvania and Ohio. A particularly large (1,000 pairs) population exists in the Mt. Zion (Piney Tract) area of PA.

The second highest priority species in the Allegheny Plateau, Upland Sandpiper has shown a non-significant population decline of -6.8% per year from 1966-1999 according to BBS trends. On a continental scale, regions showing increases outnumber those experiencing declines. Their maximum abundance was probably reached in the mid-19th century, but their numbers were severely depleted over the next half-century by a combination of habitat loss and market hunting (Veit and Peterson 1993, Bevier 1994). Upland Sandpipers are uncommon and local breeders in scattered locations throughout the Northeast and in the Allegheny Plateau where many of the existing breeding sites are in hayfields and on commercial or military airfields. Over much of its range in the Northeast, where old field habitats are maturing or being replaced, the sandpiper is slowly declining, stable at low levels, or

absent (Tate and Tate 1982, Tate 1986). Upland Sandpiper is listed in 11 Northeast states and is threatened in New York, Ohio and Pennsylvania.

Bobolinks breed widely across Northeast, including the Allegheny Plateau where they breed in 50-90% of atlas blocks. Bobolink populations experienced severe declines in the mid-nineteenth century when they were slaughtered to prevent depredation of southeastern rice fields during fall migration (Dowell 1996). Kelling (1998) reports that breeding numbers of Bobolinks in New York had been reduced due to increased urbanization and losses of farmland. Local populations also suffer nesting losses due to early haying of pastures, especially during dry summers. Nevertheless, BBS data indicate a stable population in the Allegheny Plateau region since 1966, and the only Northeast state where Bobolink is listed is New Jersey.

Sedge wren is an extremely rare and local breeder in the Allegheny Plateau and was found in less than 5% of the breeding bird atlas blocks in the region. This species is listed in 10 states across the Northeast, and within the planning unit is listed as endangered in Ohio, threatened in Pennsylvania and threatened in New York. This species was poorly sampled by the BBS and population trends in the physiographic area are uncertain, but likely tend toward the almost ubiquitous declines that grassland and wetland species in this region are showing. In this region, the Sedge Wren also occupies large, unmowed pastures, or recently fallow fields, often in association with Henslow's Sparrow. This species has a tendency to show up in widely scattered localities during the middle of summer, and many of these birds are not confirmed as breeding locally.

American Kestrels are closely tied to agricultural lands as breeders in the region, requiring cavities in remaining large trees or appropriate nesting structures in barns or silos. This species has been declining steadily, but will respond to properly conducted nest-box programs. Within the Allegheny Plateau physiographic area, Grasshopper Sparrow is listed as a species of concern in New York, and is listed in 11 Northeast States, endangered in 5, and is considered a rare breeder. It is most widespread in the Ohio portion of the planning unit, and occurs locally in moderate to high densities in agricultural regions of western New York and Pennsylvania. An especially high population exists on reclaimed strip mines in the Mt Zion (Piney Tract) area of PA. A major threat to this species (at least in NY) is residential expansion into dairy pastureland near small cities.

Habitat and population objectives: Based on extrapolations from BBS relative abundances, VERY ROUGH estimates of population size for priority species in this habitat suite can be derived (Table 4.2). These crude estimates are most useful in illustrating the relative population sizes of various species and, perhaps, giving order-of-magnitude figures for setting population objectives for the region.

Table 4.2. Population estimates and targets (number of pairs) for priority species of grassland and agricultural habitats in the Allegheny Plateau physiographic area. Percent of Atlas blocks based on number of 5-km blocks in which the species was reported (from Rosenberg and Wells 1995, appendix 3).

Species	BBS population	% lost Since 1966	Population target	% Atlas blocks		
				NY	PA	OH
Henslow's Sparrow	2,500	> 50%	5,000	12	9	24
Upland Sandpiper	240	> 50%	500	9	2	6
Sedge Wren	50	??	50	1	<1	3
Short-eared Owl	??	??	??	1	0	0
Grasshopper Sparrow	11,200	> 50%	25,000	10	19	58

For species that have declined significantly during the BBS period, a population target may be set to approximate pre-BBS population levels; an annual decline of 2.4% per year corresponds with a 50% loss over 30 years. For species suffering a 50% or greater loss since 1966, this plan calls for roughly a doubling of present-day populations as a practical objective. For species showing stable or unknown trends, population targets are roughly rounded up from current population estimates. Note that the relative abundances used to for these estimates are averages across all BBS routes in the physiographic area using data from 1990-1998. For more details on methods used for calculating populations and targets, (see Appendix 3).

OBJECTIVE 1: Roughly double existing populations to 5,000 pairs of Henslow's Sparrow and 500 pairs of Upland Sandpipers.

OBJECTIVE 2: Double existing population of Grasshopper Sparrow to roughly 25,000 pairs.

OBJECTIVE 3: Maintain stable population of 275,000 pairs of Bobolinks (averaging 14 per BBS route) on lands in active agriculture (including pastureland) with no reduction in the number of BBS routes reporting this species (approximately 100 routes).

Based on published density estimates, roughly 300,000 ha (741,000 ac) of suitable grassland habitat is needed within the agricultural matrix to support 275,000 pairs of breeding Bobolinks; of this, 2,400 ha (6,000 ac) should be suitable to support 5,000 pairs of Henslow's Sparrow; 6,600 ha (16,300 ac) should be in patches large enough to support 500 pairs of Upland Sandpipers; and 100,000 ha should be in suitable condition to support 25,000 pairs of Grasshopper Sparrows. Specific sites known to support uncommon and area sensitive species should be protected.

Assumption: maintaining suitable habitat for these focal species will be sufficient to ensure the long-term representation of the full habitat/species suite in this region.

Implementation strategy: Maintaining existing populations of any grassland bird species in the Allegheny Plateau is closely associated with human use of their habitats. Most of the grasslands in the region are of agricultural origin, yet, many modern agricultural practices can be detrimental to successful reproduction of these species. This contradiction needs to be considered in any implementation strategy. If farmers are unable to "earn a living", these lands will be converted to other uses such as residential developments and surrounding land will revert to forest. This scenario is evident throughout the Northeast and portions of the New York and Pennsylvania are strong examples of this. Keeping farmland as farmland and balancing any detrimental effects of agricultural uses will be key to successful implementation. Combinations of increased awareness among conservationists and the public are essential for successful implementation.

Mitchell et al. (2000) recommend a multi-faceted approach to curtail declines in grassland breeding birds throughout the Northeast. It includes:

- Maintenance of existing grassland habitats
- restoration of degraded grasslands
- creation of new grassland habitats
- education and outreach efforts to encourage agricultural practices that reduce impacts on grassland nesting birds.
- ongoing monitoring, evaluation and assessment programs.

A good list of landowner incentive programs are listed in Appendix 4 of this report and is separated out by habitat type. Landowners and managers can reference this section to locate programs that will help promote bird conservation through habitat acquisition and management and other conservation measures.

Important Bird Areas

Many Important Bird Areas that have been identified in the planning area contain important grassland habitat and will be an important focus for implementation phase of the PIF conservation plans. As a part of the IBA designation process, conservation strategies for these sites will be produced. Important sites for grassland birds are (Wells 1998, Crossley 1999):

New York

- Caswell Road Grasslands Complex-1,343 acres; Private. Primarily grassland with significant shrub/scrub and deciduous woods with smaller sections of coniferous woods and non-tidal wetlands. Important breeding habitat for Northern Harriers (1 pair in 1995), Upland Sandpipers (1-2 pairs in 1996), Henslow's Sparrows (5+ pairs in 1995, 10-12 pairs in early 1990s), Grasshopper Sparrows (3-4+ pairs in 1995), Savannah Sparrows, and Bobolinks (30+ pairs in 1995).

- The Center at Horseheads Fields-196 Acres; Private/ Public. 100% Grassland. This area supports breeding Upland Sandpiper (4 in 1996), Grasshopper Sparrow (6 pr. in 1996), Horned Lark, Savannah Sparrow (20 pr. in 1996), Eastern Meadowlark (8+ pr. in 1996), and American Kestrel (1 pr. in 1996). Henslow's Sparrow have occurred as a spring migrant (1 in 1996) and possibly breed. This is the only historic nesting site of Upland Sandpipers in the southern Finger Lakes region.
- Finger Lakes National Forest-14,500 acres; Non-tidal wetland, riparian, deciduous woods, shrubland, and agricultural grassland and cropland. Important as a grassland bird breeding site for Northern Harriers, Upland Sandpipers (though none since 1990), Sedge Wrens (1 pr. in 1997), Henslow's Sparrows (30-45 pr. in 1997), Grasshopper Sparrows, Vesper Sparrows (1 pr. in 1997), Savannah Sparrows, Eastern Meadowlarks, and Bobolinks.
- Hemlock and Canadice Lakes-38,400 acres; Mostly private. Significant grassland. The site supports breeding populations of a number of other state-listed species including Northern Harrier, Upland Sandpiper, Henslow's Sparrow (present 1997) and Horned Lark.
- Hi-Tor Wildlife Management Area-6,100 acres; Public (NY DEC). Some grassland habitat. Bobolink and Eastern Meadowlark are breeders.
- Keeney Swamp State Forest-2,170, Public (NY Dept. Env. Cons.) /Private. Some grasslands remain within the state forest and these support breeding Northern Harrier, Vesper Sparrow, Bobolink, and Eastern Meadowlark. Upland Sandpipers have been regularly noted here during spring migration.
- Letchworth State Park-14,342 acres; Public (state and federal). 1% grassland. This includes breeding Northern Harriers (2pr. in 1996), Grasshopper Sparrows (6 pr. in 1996), and Henslow's Sparrow (10 pr. in 1996). Short-eared Owl (E) occurs in the winter.
- Long Pond State Forest-3,254 Acres; Public (NY DEC). Mixed woods with some large portions of grassland and shrub/scrub. Site is particularly important as a breeding site for grassland birds including Henslow's Sparrow (19 pairs in 1995, 7 in 1996) and Grasshopper Sparrow (3+ pairs in 1996).
- Widger Hill-100+ acres; Private. Grassland. An important grassland bird breeding area, hosting Henslow's Sparrow (6 pairs in 1996), Grasshopper Sparrow (6+ pairs in 1996), Savannah Sparrow, Bobolink (4+ pairs in 1996), and Eastern Meadowlark (6 pairs in 1996).

Pennsylvania

- Akeley and Mahaffey Wetlands – SGL 282.- 500 Acres; Public (PA Game Comm.). Emergent Wetlands, some forest bordered by agriculture and some brushy areas. Breeding species include Northern Harrier (3 pairs).
- Erie National Wildlife Refuge-8,750 Acres; Public (USFWS). 2500 Acres of wetlands, beaver floodings, marshes, swamps, wet meadows and impoundments. Also forested valley, mixed forest grasslands and cultivated fields. Breeding species include Northern Harrier, Sedge Wren, Bald Eagle and grassland management hopes to soon attract Henslow's Sparrow and Upland Sandpiper.
- Moraine State Park -1,835 acres of grassland habitat.
- Mount Zion (Piney Tract)-2,300 Acres; Private. An area of reclaimed strip mines with grassland habitat and some wetlands. An extremely important site for breeding Northern Harrier (2+ pairs), Short-eared Owl (2+ pairs), Upland Sandpiper (2+ pairs), Henslow's Sparrow (1000 pairs), Grasshopper Sparrow (1000 pairs) and Savannah Sparrow (1000 pairs).
- Powdermill Nature Reserve-2,000 Acres; Private. Mixed and deciduous forest, woodland streams, managed grassland habitat and old fields. Breeders include Bobolink, Grasshopper Sparrow and Savannah Sparrow.

- Pymatuning -Roughly 2,000 acres of grassland habitat.

Ohio

Many Important Bird Areas in Ohio have been nominated, but information on species present and habitat are currently unavailable (Table 3.3).

Management recommendations: In the Northeast, habitat destruction through urbanization, row-crop agricultural techniques, and ecological succession in which encroachment of woody species into grasslands reduce the available breeding habitat are drastically affecting populations of nearly all the priority species in this habitat suite. Fragmentation of habitat into small, widely scattered plots is another serious threat affecting multiple species.

Habitat area is clearly one of the most important characteristics to providing optimal habitat for grassland breeding birds. Numerous studies in the Northeast have revealed a positive relationship between grassland area and the diversity and abundance of breeding birds using a grassland (Bollinger and Gavin 1992, Smith and Smith 1992, Vickery et al. 1994, Norment et al. 1999). These clear results suggest that increasing grassland area is one obvious means of increasing grassland bird populations. Consideration should be given to consolidation of adjacent grassland fields, through the elimination of hedgerows, stone fences, or tree lines, in areas where open land occupies a considerable amount of the surrounding landscape and grassland management can be identified as a reasonable management alternative. Connecting adjoining fields could increase the overall abundance or diversity of grassland birds using an area above what the fields would accommodate separately.

Intact grasslands large enough to support breeding populations of some of the more area-sensitive species and those with larger home ranges are rare in this physiographic region. In general, fields < 10 ha in size should be considered low priorities for grassland maintenance or enhancement activities, while areas > 100 ha should be the highest priorities for such actions. While grasslands as small as 150 acres may be sufficient for more area sensitive species such as Upland Sandpiper, evidence shows that these birds are more likely to persist and reproduce in grasslands of higher acreage. Ideally, grasslands of 500+ ha would provide viable populations of all species in this habitat suite (Carter 1992, Herkert 1994, Jones and Vickery 1997, Tate et al. 1999, Johnson et al. 1999).

Many Refuge managers and other wildlife managers in the region prefer to establish warm season instead of cool season grasses because of ease of maintenance with prescribed fire. Warm season grasses emerge late in the spring, creating a wide window of opportunity for conducting dormant-season prescribed burns, which stimulate warm season grass productivity. Studies in the Midwest have demonstrated that several species of grassland birds respond positively to prescribed fire in warm season grasslands (Sample and Mossman 1997). Species such as Grasshopper Sparrow, Savannah Sparrow, and Bobolink have shown increases in breeding activity following prescribed burns (Herkert 1994, Johnson 1997). In contrast, recent studies have shown that dormant-season burns fail to increase grass cover (Howe 1995, Mitchell 2000) and often fail to reduce shrub cover (Euler 1974, Mitchell 2000) in cool season grasslands.

If current mixtures of warm season grasses fail to provide adequate habitat for grassland breeding birds in the Northeast, it may be advisable for managers to focus on cool season grasslands to meet habitat objectives. As described by Norment (1999b), "if the primary management goal is to create good habitat for grassland birds, then planting nonnative cool season grasses may be a more effective strategy, at least in cooler parts of the Northeast." As an alternative, different warm season grass mixtures may need to be developed. Work by Norment (1999a, 1999b) and Paton (1999), and studies in Wisconsin (Sample and Mossman 1997, p. 65), indicate that alternative grassland mixes, such as shorter grasses, lower seeding rates, or mixes of warm and cool season grasses, may provide better grassland bird breeding habitat.

Prescribed fire can be an effective tool to prevent woody encroachment in grasslands. Fire alters the structure of grasslands by reducing woody species cover, decreasing litter, and removing dead, aboveground vegetation (DeBano et al. 1998). These effects could reduce vegetation density and overall community height in warm season grasslands, making them more attractive as nesting habitat for grassland birds. However, fire also has been shown to increase productivity of warm season grasses (Howe 1995, DeBano et al. 1998). Prescribed fire could increase height and

density of live stems of tall grasses in warm season grass plantings, making them potentially less attractive to grassland breeding birds.

Used on a large scale, fire can also be more cost-effective than mowing and herbicide treatments. Similar management practices that apply prescribed burns of agricultural mowing in early spring or well after breeding will likely benefit most species in this habitat suite (Carter et al. 1999, Dechant et al. 1999, Tate et al. 1999, Stewart 1975, Whitmore 1981, Frawley 1989, Rodenhouse et al. 1995, Vickery 1996). However, inappropriately applied these management tools are detrimental to grassland birds.

Mowing can also be an effective means of managing grassland habitat, but can also negatively affect grassland birds if done during the wrong time of year. Furthermore, it may not be totally effective in eliminating woody vegetation from shrub-dominated fields. Since many of the high priority grassland birds in this planning unit can raise two broods in a single breeding season, postponing mowing until after September 1 will allow these birds the greatest opportunity to maximize annual reproductive success. At a minimum, mowing should be delayed until late June to allow for young to fledge from first nesting attempts. Bollinger (1995) found that fields with early mowing dates the previous year had lower bird densities than fields with later mowing dates. He suggested that mowing-induced nest destruction was partially responsible for lower breeding densities in the following year. While some studies have shown that abundance of some grassland birds is reduced in the year following mowing (Bollinger 1995, Herkert 1995, Mazur 1996), Norment (1999) found high numbers of grassland birds in fields that had been mowed during late summer or fall of the previous year.

If mowing every two or three years is sufficient to deter woody growth, such a schedule may be more beneficial to grassland bird than annual mowing. Warm season grassland do not need to be mowed as frequently as cool season grassland to control shrub invasion, so a three to four year schedule may be adequate for warm season grasses (Myers and Dickson 1984). Thus, dividing fields and mowing sections on a rotational basis, where feasible, may be the most appropriate means of using mowing to manage grasslands for bird populations.

Improving habitat for Henslow's Sparrow and other species will require fire and grazing management at a low enough frequency to allow sufficient litter buildup and a high density of dead vegetation to accrue. Intensive production of row crops also reduces or eliminates the use of hay fields and grazing land by many species in this habitat suite. Periodic mowing may still be a viable option for maintaining grasslands suitable for use, provided that mowing is done well after the breeding season is concluded and young and adults have dispersed (Smith et. al 1999).

In addition to broad outreach efforts targeted specifically for agricultural lands, the many small native grasslands also need attention. Many of these sites are formed on natural sandplains and need regular burning to remain suitable for grassland birds. Sandplain grasslands are a fairly rare community in the northeast and support other rare species of plants and animals. Ensuring that grassland bird issues are incorporated into management plans for protected natural grasslands is an obvious first step. Protection of these sites through acquisition may be easier if justification can be based on priority birds as well as rare plants and invertebrates.

Restoration or new establishment of grasslands (e.g., from strip-mined areas) also may offer potential habitat. Short-eared Owls, Henslow's Sparrow and several others have been shown to breed in old strip-mines. This species suffers from loss of grassland to development, changing land-use patterns, wetland loss, and changing farming practices (Tate et al. 1999). Airports and airfields also offer excellent habitat for breeding colonies, providing level expanses of short grass fields attractive to Upland Sandpipers and other grassland birds in this region.

Nest-box programs and specifications for American Kestrels...

Because such a large proportion of grassland birds in this region are in decline we include some brief species abstracts to highlight the priority and habitat requirements of several grassland birds and direct attention to management of these species:

HENSLOW'S SPARROW

Breeding Habitat Characterization: Breeding habitats for Henslow's Sparrow in the Northeast have been described as: active and inactive pastures, wet meadows, old weedy fields, wet or damp fields and swales, abandoned strip mines, hayfields, wet and dry grassy fields with scattered shrubs and *Carex* spp.-*Deschampsia* spp. grasslands. Smith

(1997) suggests that Henslow's Sparrows in the East probably historically occupied primarily the edges of inland wet meadows created by beaver activities and coastal saltmarshes.

In surveying Broome County, New York, Peterson (1983) found Henslow's Sparrow on 4 sites, 3 of which were ungrazed pasture. The fourth site was an agricultural field dominated by timothy. The mean grassland area for sites containing Henslow's Sparrows (66 ha) was significantly greater than the mean of unoccupied sites (19 ha). The smallest site containing the sparrow was about 36 ha. All four sites were dominated by grasses and forbs, and contained widely scattered, low shrubs.

Smith (1997) observed Henslow's Sparrows on grazed pastures in central New York. Of 5 pastures occupied by Henslow's Sparrows, 4 were lightly grazed and one was set aside for hay. Sparrow territories were found on pastures that had been mowed from one to six years previously, in late summer. Vegetation height in Henslow's Sparrow territories averaged 61.3 cm, and contained 12.5% goldenrod (*Solidago* spp) cover. The average size of the pastures was 51.7 ha, with a minimum of 33.2 ha. Pastures containing Henslow's Sparrows contained 25% goldenrod. Smith (1997) suggested that 30 ha may represent a breeding minimum field size for the species, since Henslow's Sparrows were absent from fields of similar vegetation and smaller size.

In central New York, Bollinger (1995) found Henslow's abundance to be positively correlated with hayfield age and size, and negatively correlated with vegetation height. The researcher found Henslow's in the largest, oldest (>10 yrs.) fields, with "shorter, sparser, patchier, grass-dominated vegetation and greater litter cover." Bollinger (1995) points out that hayfields in the Northeast are generally highly productive overall, and that older fields in the Northeast more likely resemble the structure of native midwestern grasslands than recently-established northeastern hayfields.

Graber (1968) characterized Henslow's Sparrow habitats in the Midwest as grassy fields and pastures, often poorly drained and sparsely vegetated with low shrubs. Studies in the Midwest indicate that Henslow's habitats contain thick litter and standing dead vegetation (Hands et al. 1989, Swanson 1996). Herkert (1994a, 1994b) reported that Henslow's Sparrows prefer tall herbaceous vegetation, dense vegetation, and high amounts of standing dead material. Zimmerman (1988) hypothesized that standing dead vegetation depresses aboveground grass productivity, resulting in an open subcanopy preferred by Henslow's Sparrows. Kahl et al. (1985) reported that high litter coverage (95%) was optimum for the species. In contrast, some researchers in the Northeast have found the sparrows on moderately grazed pastures, and recently mowed grasslands, containing little dead vegetation (Smith 1997).

For more specific habitat information see Mitchell et al (2000).

UPLAND SANDPIPER

Breeding Habitat Characterization: Upland Sandpipers breed in extensive, open grasslands, which in the Northeast historically included old hayfields, pastures, wet meadows, sandplain grasslands, and blueberry barrens. They tend to be loosely colonial while breeding and often return to the same nesting fields in successive years (Carter 1992). Nesting territories generally are grouped, with independent nesting sites but adjacent communal areas for feeding and loafing (Swanson 1996). A variety of vegetation structures are required by this species for breeding. They build their nests in areas of mixed, tall grasses and forbs (but not > 60 cm) and they forage in areas with short grasses (Swanson 1996, Jones and Vickery 1997). They generally do not occupy areas with uniform graminoid or forb cover (Buhnerkempe and Westmeier 1988, Swanson 1996). A variety of native and introduced grasses have been associated with Upland Sandpiper nesting fields, including timothy (*Phleum* spp.), bluegrass (*Poa* spp.), needlegrass (*Stipa* spp.), bluestem (*Andropogon* spp.), quackgrass (*Agropyron* spp.), Junegrass (*Koeleria* spp.), and brome grass (*Bromus* spp.) [Carter 1992].

Vickery et al. (1994) found that in addition to grassland area, the only vegetation parameter that was a significant predictor of Upland Sandpiper abundance in Maine grasslands was patchiness of cover types. The density of this species was subsequently found to be positively associated with bare ground and negatively correlated with tall forbs and tall shrubs (Vickery et al. 1999). In New York, Bollinger (1995) found Upland Sandpiper abundance to be negatively associated with total vegetation cover and vegetation height.

In Wisconsin, mean vegetation characteristics of nesting habitat were 0.5% wood cover, 81% herbaceous cover, 4% bare ground, 15 % litter cover, and 45 cm maximum vegetation height. In Canada, mean characteristics of nesting sites were 75-95% grass cover, 0-5% forb cover, 5-25% litter cover, 5-25% bare ground, and 12 cm average vegetation height (Swanson 1996).

SEDGE WREN

Decline of this species throughout its range has been associated with loss and degradation of wetlands (Ehrlich et al. 1992), caused by suburbanization, intensive agricultural development, and natural succession. Loss of nesting habitat may be the major cause of declines in populations. About 4.75 million acres (1.92 million ha) of palustrine emergent wetlands, which include wet meadows important to nesting, were lost in the U.S. between the mid-1950s and mid-1970s (Tiner 1984). The preferred wetland type, sedge/grass meadows with moist or saturated soils, are the most easily drained and filled type.

BOBOLINK

Breeding Habitat Characterization: In the Northeast, Bobolinks reportedly breed in: dairy farm hayfields, older hayfields dominated by grasses and legumes, poorly drained and well-drained hayfields, conservation hayfields cut in late summer, old agricultural fields, sandplain grasslands, and lightly grazed pastures.

Bollinger and Gavin (1989, 1992) and Bollinger (1995) found breeding Bobolinks were more abundant in older, active hayfields (not replanted in ≥ 8 yrs.) in New York. The birds were less abundant in young hayfields (disturbed within past 8 yrs.), oat fields, lightly grazed pastures, heavily grazed pastures, old agricultural fields ($< 25\%$ woody cover), and brushy fields ($> 25\%$ woody cover). Bollinger and Gavin (1992) concluded that Bobolinks in eastern U.S. prefer vegetation dominated by tall grasses, i.e. older hayfields. Bollinger et al. (1990) reported Bobolink abundance to be highest in grasslands with low legume cover, high litter cover, and high grass/legume ratios.

Joyner (1978) reported that Bobolinks in Ontario, Canada, nested in grasses and weeds, including Canada goldenrod (*Solidago canadensis*), tufted vetch (*Vicia cracca*), and birdsfoot trefoil. Vegetation around nests was 33-41 cm tall and dominated by forbs, although each nest had a canopy of dead grasses about 10 cm above the nest. In Illinois, Bobolink occurrence was positively associated with mean vegetation height, mean live forb composition, and mean grass height (Herkert 1994). In Wisconsin, Bobolinks preferred treeless grasslands with dense vegetation (Sample and Mossman 1997). Mean grass height in Bobolink territories in Oregon was 51 cm during June (Wittenberger 1980). Kantrud (1981) reported that Bobolink density was highest in tall, dense grasslands, versus grazed grasslands in North Dakota. In Nebraska, Delisle and Savidge (1997) found Bobolinks to be more abundant in moderately dense, cool season grasses versus fields containing denser, taller, native grasses, including big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), and indiangrass (*Sorghastrum nutans*). Relative abundance of Bobolinks was positively related to percent litter cover.

GRASSHOPPER SPARROW

This sparrow breeds from central New England south, and was once considered abundant at lower elevations across New England (Jones and Vickery 1997, Salzman and Smith 1998). Grasshopper Sparrow abundance has declined as agricultural grasslands have been abandoned or converted to row-crops or urban developments (Jones and Vickery 1997, Salzman and Smith 1998).

Breeding Habitat Characterization: Grasshopper Sparrows have been observed breeding in the following habitats in the Northeast: lightly grazed pasture, reclaimed surface mines, old hayfields, moderately grazed pastures, coastal grassland barrens, airfields and conservation, cool season grasslands.

Whitmore and Hall (1978) found Grasshopper Sparrows to be abundant on reclaimed surface mines in West Virginia: up to 17 pairs per 10 ha. Dominant vegetation was fescue (*Festuca* sp.), birdsfoot trefoil (*Lotus corniculatus*), red top (*Agrostis gigantea*), timothy (*Phleum pratense*), and oats (*Avena* sp). Whitmore (1979a) reported average heights of vegetation in breeding territories between 22-36 cm. Sparrow breeding activity increased as vegetation height and grass cover decreased, and bare ground increased, over time. Conversely,

sparrow pairs decreased as grass cover increased, and bare ground declined. Wray et al. (1982) also found that Grasshopper Sparrow abundance declined as grass density increased.

During peak breeding periods, Whitmore (1979b) observed that Grasshopper Sparrow territories had average litter depths of 1.5 cm. Whitmore (1979a) concluded that the sparrows require sparsely vegetated grasslands with at least 24% bare ground, 74% litter cover, and 27% grass cover, at the time of spring arrival. Whitmore (1981) found lower values for the following variables in Grasshopper Sparrow territories vs. non territories: grass/forb/shrub/litter cover and litter depth. Mean bare ground in territories was 29%, while mean grass cover was 25.7%. The researcher pointed out that Grasshopper Sparrows prefer to nest in bunchy grasses, and forage in openings or gaps between bunches. Wray et al. (1982) reported that increased litter and grass density inhibits Grasshopper Sparrow foraging efficiency.

Vickery et al. (1994, 1999) evaluated Grasshopper Sparrows on Maine grassland barrens. The researchers identified area, short graminoid cover, and forb cover as significant, positive predictors of Grasshopper Sparrow relative abundance, with litter cover and blueberry cover negatively associated with this species. Bollinger (1995), in sampling 90 hayfields in New York, found Grasshopper Sparrows breeding on older fields (had not been replanted in ≥ 15 yrs). Grasshopper Sparrow abundance was positively related to plant richness, field size, and vertical patchiness, and negatively related to litter depth. According to Bollinger, Grasshopper Sparrows “prefer the lowest and sparsest fields” (Bollinger 1991) with short, patchy, grass-dominated vegetation (Bollinger 1995).

Smith (1997) observed Grasshopper Sparrows breeding in pastures in central NY. The minimum pasture area containing Grasshopper Sparrows was 16.2 ha, with an average size of 49.1 ha. On average, Grasshopper Sparrows occupied the least productive of the pastures studied. The researcher recorded the following habitat characteristics: mean grass height/territory of 54 cm; mean percent goldenrod/territory of 9.4%; and mean percent goldenrod/pasture of 38.5%. Grasshopper Sparrows bred on fields that had been mowed 1 to 6 years earlier. Smith noted that the Grasshopper Sparrows appeared to prefer shorter vegetation than Henslow’s Sparrows (Smith 1997).

Minimum Grasshopper Sparrow breeding habitat in the Northeast is characterized by large areas (20-30 ha) with abundance increasing with habitat size. Preferred habitats contain bare ground (about 25%), grasses of short to medium height (20-50 cm), and shallow litter (0-2 cm). Suitable habitats are found in old hayfields (Bollinger 1995), although the birds also breed in moderately grazed pastures (Smith 1997) and ungrazed, cool season grasslands (Normont 1999a). In the Midwest, Grasshopper Sparrows reportedly nest in low, sparse, grass-dominated habitats, with shallow litter (Cody 1968, Wiens 1969), including hayed and burned sites (Swengel 1996). Kahl et al. (1985) report optimum vegetation height of 20-30 cm and litter depth of 0.1-1.0 cm for the species in Missouri.

Resources

Species-specific and general grassland bird management recommendations are available from several sources:

The proceedings of several major conferences and groups have been published and offer major insights into the management of Neotropical migratory birds, and especially forest species (Martin and Finch 1995, Finch and Stangel 1993, Hagan and Johnson 1992). DeGraff and Rudis (1986) and DeGraff et al. (1992) are specific to the Northeast. Also read Maryland PIF (1997) for more specific recommendations tailored to different types of grassland birds. Jones and Vickery (1997) is an excellent resource tailored to grassland managers with species specific information. Mitchell et al. (2000) is an excellent literature review for grassland birds in the Northeast.

The Nature Conservancy’s Wings of the Americas website provides links to additional species management information available from the Northern Prairie Wildlife Research Center of the U.S. Geological Survey, Biological Resources Division, the Army Corps of Engineers, Waterways Experiment station, and the Wilderness Society’s (TWS) Migratory Bird Initiative. They also reference the appropriate publication number for the Birds of North America series and provide links or contact information maintained by Partners in Flight to species accounts developed by the US Fish and Wildlife Service.

Wings Info Resources / Species Information and Management Abstracts:
<http://www.tnc.org/wings/wingresource/birddata.htm>

Research and monitoring needs: A variety of methods, centered largely around haying practices, have been proposed to minimize losses of Bobolink and other species' nests and nestlings during typical agricultural activities (Bollinger and Gavin 1992, Jones and Vickery 1997). However, little is known about relative reproductive success following these practices. For example, would leaving unmowed sections or strips increase fledging success or serve to focus mammalian predation on nests later in the season when females are less likely to renest? Furthermore, lifetime reproductive output is not known for individuals in agricultural ecosystems in the Northeast.

Within the planning unit, populations of 8 of the 11 focal species within this habitat appear adequately monitored by the BBS with a minimum of 15 of 123 possible routes reporting for those species. Supplemental surveys for grassland species have been conducted periodically and should be continued. Monitoring programs for Upland Sandpiper are currently conducted in states where the species has special status including Pennsylvania. For Henslow's Sparrow, a more targeted effort will be required to locate suitable breeding sites and evaluate population status throughout the region.

Monitoring of grassland birds, like other species with patchy distributions, will require special efforts targeted toward appropriate habitats. A separate monitoring program for grassland birds within the Allegheny Plateau, may be inappropriate. Rather, specific sites within the region could be included in a northeast regional program. In particular, the excellent survey program conducted by Massachusetts Audubon Society in New England and New York should be continued and expanded to other northeastern states.

Effective censusing for some species can be difficult and some techniques have the potential to increase nest predation. In areas with dense, regularly occurring populations of priority grassland species, local population should be monitored by annual census. Where breeding activity is very scarce and sporadic, casual reports from birdwatchers may be the only feasible means of surveying populations. Birdwatchers should be actively encouraged to search in old fields and along grassy, wetland margins throughout the summer months. Biologists employed by private consulting firms to inventory wetlands and farmlands associated with potential development sites may represent a valuable source of information on occurrences.

Monitoring programs at Important Bird Areas are in the planning stages for several state programs. They will begin after an inventory has been taken and will be carried out by volunteers. These efforts may or may not well cover Partners in Flight priority species, but rather will be targeted at species within the IBA that met criteria in identification of the IBA. For example, small grasslands as part of a large wetland complex harboring large populations of wintering waterfowl may lack priority if manpower is low.

The Northeast PIF Grassland Bird Working Group could be used to nominate sites based on results of the regional grassland bird surveys conducted by Massachusetts Audubon in 1997 and 1998. State working groups could assist with identifying qualified volunteers to perform the actual counts.

Specific research and monitoring needs in this physiographic area include:

- Determine precise habitat and area needs of Henslow's Sparrow in this region. Research should include demographic factors in order to determine characteristics of sites with potential to support source populations.
- Develop and implement supplemental inventory and monitoring programs to identify important sites for Henslow's Sparrow and other uncommon, patchily distributed grassland species not well monitored by BBS.
- Evaluate the effects of specific farming and management practices, such as timing of haying and grazing intensity, on productivity of grassland birds.

Outreach: Considerable effort has been given to developing guidelines for management of grassland habitats in the northeast (see booklets by Jones and Vickery 1997). We encourage the broad distribution of these materials throughout the region. Agency personnel could be especially effective at encouraging airports to consider habitat management for grassland birds, which may actually discourage loafing by species such as gulls and other large birds. Agency personnel also should consider their land management practices on refuges and wildlife management areas in the region and consider delaying mowing for as long as possible. Despite the overall increased awareness

and outreach materials developed for this suite of species, more needs to be done to reverse declining trends in populations of grassland birds in the Allegheny Plateau.

Another tool for grassland conservation with tremendous potential is conservation of open space. Conservation of open space has benefits for property tax stability, ecotourism and maintenance of nearby property values (Kerlinger 2000). The state of New York has a state open space plan (NYDEC 1998) that outlines regional priorities for state land acquisition. Wildlife and ecosystem conservation may act as supporting criteria in qualifying a land for acquisition and increasing its priority. Unfortunately, many current priorities are targeted at purchasing access areas for recreational activities and little money is even indirectly targeted at wildlife conservation. Continuing effort to include wildlife conservation priorities in the agenda may yield great rewards.

C. Riparian-deciduous (oak-hickory) forest

Importance and conservation status: The deciduous forests of the Appalachians reach their northern limit in the Allegheny Plateau region and are among the most diverse forests in North America. The majority of these forests are dominated by oaks, with important distinctions in species composition (including mixing with pines) that are dependent on gradients of moisture and elevation. Forests broadly classified as oak-hickory cover 3.3 million ha., or 27% of the physiographic area (Fig. xx). The largest tracts are in the southern half of the physiographic area in western Pennsylvania and also in a belt from the Pocono Mountains in PA to the lower slopes of the Catskill Mountains in NY. Smaller, but significant, tracts are scattered across the Finger Lakes region of New York. This forest type generally occurs at lower elevations and includes bottomland-hardwood communities, including forests dominated by sycamore, box-elder, elms, maples, ash, or cottonwood.

From a bird-conservation perspective, the importance of this habitat type is great, because of the number of associated bird species with high priority scores in the planning unit. In general, these species are relatively abundant throughout the region, but many also show significantly declining population trends in the Allegheny Plateau. Setting habitat and population objectives is therefore not as straightforward as in rare or patchy habitat types. Conservation planning should focus on extensive tracts of representative forest types, and should address the microhabitat needs of species showing regional or local declines.

Many of the priority species in this habitat suite are typically described as needing large tracts of mature deciduous forest. Although estimates of minimum forest area in which the different species are likely to breed are necessary, landscape context and overall levels of forest cover on a regional basis are likely to be a more important factor than tract size in determining important parameters such as probability of occurrence and nest success. In general, most of the studies that have been done on these species suggest that within regions that have relatively high overall forest cover (e.g., $\geq 70\%$), negative impacts from edge effects, predation pressure, and parasitism are less than in less forested regions (e.g., Robinson et al. 1995, Gale et al. 1997, Hoover and Brittingham 1993, Rosenberg et al. 1999).

While these factors indicate significant conservation concerns within portions of this planning unit, several other characteristics of this unit provide positive qualities from which to base conservation efforts. The Allegheny Plateau is currently over two-thirds forested and lies within the overall well-forest region of the northeastern United States. Forest cover within many parts of this region has returned to levels near what existed at the time of European settlement. Relatively large tracts exist that have high forest cover and significant populations of species like Cerulean Warbler, Wood Thrush, Scarlet Tanager, and Louisiana Waterthrush. These landscapes have the ability to provide source populations of these species and thereby supply individuals to potential sink populations in less forested landscapes throughout this physiographic area. These important areas need to be protected from development and the forests in these areas need to be managed in such a way to promote the vegetation structure and composition most suitable for these species.

Associated priority species: CERULEAN WARBLER, WORM-EATING WARBLER, WOOD THRUSH, LOUISIANA WATERTHRUSH, Black-billed Cuckoo, Scarlet Tanager, Eastern Wood-pewee, Red-headed Woodpecker, Kentucky Warbler, Red-shouldered Hawk, Long-eared Owl, Cooper's Hawk.

Many of the highest priority species within this habitat suite are near the northern limit of their range, but still occur widely where oak-hickory forest remains. The focal species occupy the full range of mature deciduous forest types

and represent optimal conditions of canopy structure (Cerulean Warbler), understory structure (Wood Thrush, Worm-eating, Kentucky warblers), and specialized conditions along streams (Louisiana Waterthrush).

Cerulean Warbler is one of the fastest declining songbirds in North America and is currently being considered for threatened listing under the federal endangered species act. It is currently listed as a species of concern in 13 states, threatened in two states and endangered in 1 state. Within the planning unit it is listed as a species of concern in Ohio and New York. In this region, Cerulean Warbler is showing a non-significant decline of -3.2% per year, but it is showing a significant survey-wide decline of -4.0%. The largest known present-day populations are in the Allegheny State Park area of New York (165 pairs), the Delaware River drainage of northeastern Pennsylvania (50+pairs), and in the Lake Metroparks area near Cleveland, Ohio (Rosenberg et al. 2000).

Worm-eating Warbler and Kentucky Warbler are patchily distributed, primarily in the southern portions of the physiographic area. Other priority species, such as Wood Thrush, Scarlet Tanager, and Eastern Wood Pewee, are much more common and widespread, but have declined at similar rates. Of the two priority raptor species occupying this habitat type, Red-shouldered Hawks are uncommon and declining, whereas Cooper's Hawks are more widespread and are apparently increasing. The declines of many forest-breeding species in the face of increasing re-forestation in this region are enigmatic and may signify problems with habitat quality and structure, rather than quantity.

Habitat and population objectives: Based on extrapolations from BBS relative abundances, VERY ROUGH estimates of population size for priority species in this habitat suite can be derived (Table 4.4). These crude estimates are most useful in illustrating the relative population sizes of various species and, perhaps, giving order-of-magnitude figures for setting population objectives for the region.

Table 4.4. Population estimates and targets (number of pairs) for priority species of Deciduous and riparian habitats in the Allegheny Plateau physiographic area. Percent of Atlas blocks based on number of 5-km blocks in which the species was reported (from Rosenberg and Wells 1995, appendix 3).

Species	BBS population	% lost Since 1966	Population target	% Atlas blocks		
				NY	PA	OH
Cerulean Warbler	11,200	> 50%	25,000	5	11	67
Worm-eating Warbler	3,000	> 50%	6,000	2	6	4
Wood Thrush	495,000	> 50%	1,000,000	98	89	100
Louisiana Waterthrush	16,000	stable?	16,000	35	26	36
Black-billed Cuckoo	47,000	> 50%	100,000	40	33	36
Scarlet Tanager	270,000	32%	400,000	90	90	99
Red-headed Woodpecker	2,500	> 50%	5,000	15	6	76
Kentucky Warbler	4,600	> 50%	10,000	0	7	48

For species that have declined significantly during the BBS period, a population target may be set to approximate pre-BBS population levels; an annual decline of 2.4% per year corresponds with a 50% loss over 30 years. For species suffering a 50% or greater loss since 1966, this plan calls for roughly a doubling of present-day populations as a practical objective. For species showing stable or unknown trends, population targets are roughly rounded up from current population estimates. Note that the relative abundances used to for these estimates are averages across all BBS routes in the physiographic area using data from 1990-1998. For more details on methods used for calculating populations and targets, (see Appendix 3).

OBJECTIVE 1. Reverse declining trend and sustain a regional population of 25,000 pairs of Cerulean Warblers distributed among the existing large forest blocks (e.g., ≥ 1700 ha; Hamel 1992) within this planning unit.

OBJECTIVE 2. Halt population declines and maintain stable breeding population of 1 million pairs of Wood Thrushes (10-13 birds per BBS route) distributed throughout the physiographic area.

OBJECTIVE 3. Maintain a sustainable population of 6,000 pairs of Worm-eating Warblers

OBJECTIVE 4. Maintain a sustainable population of 16,000 pairs of Louisiana Waterthrushes distributed among a large number of watersheds within well-forested landscapes.

Assumption: maintaining suitable habitat for these four focal species will be sufficient to support sustainable populations of most other birds in this habitat suite.

Based on published average density estimates of 3 pairs/10 ha for Wood Thrushes across their range (Roth et al. 1996), roughly 3.2 million ha of hardwood and mixed forest is required to support entire habitat-species suite, including 1,000,000 pairs of Wood Thrush; of this total, 25,000 ha of mature oak-hickory and riparian forest is required to support 25,000 pairs of Cerulean Warblers and 6,000 pairs of Worm-eating Warblers. Habitat for Worm-eating Warbler should be distributed across the region in a system of large forest blocks (e.g., ≥ 350 ha; Robbins et al. 1989) with minimal nonforest edge and a high probability of producing source populations. In addition, 24,000 km of forested streams are required to support 16,000 pairs of Louisiana Waterthrush.

Implementation strategy: Implementing the broad objectives for this habitat-species suite will require a comprehensive forest management plan for the entire Allegheny Plateau region (and adjacent physiographic areas) that acknowledges the long-term importance of maintaining large source populations of priority forest birds. Elements of such a plan that are most relevant to the high-priority birds include:

- maintaining a balance of forest-age structures, including adequate amounts of mid-successional as well as late-successional forest;
- ensuring long-term tree-species composition; i.e. prevent loss of particular species, through disease or selective harvest;
- ensuring adequate structural diversity, especially regarding canopy and understory components (shrubs, treefalls); monitor effects of natural disturbances (e.g. wind storms) as well as insect outbreaks, deer browsing, and forestry practices;
- setting maximum allowable levels of forest fragmentation due to forestry practices or planned development; e.g. do not allow any 10,000 km² landscape to fall below 70% forest cover;
- identify and designate Bird Conservation Areas (BCA), within which long-term sustainability of priority bird populations is a primary management objective.
- identifying specific sites that currently support potential source populations of priority species and designating these as Important Bird Areas in each state.

Note that this strategy applies to all forest types in the planning unit, including northern hardwood and mixed forests (see below). Objectives for widespread forest generalists will involve combined efforts in both forest types. Specific implementation strategy for the highest-priority species, Cerulean Warbler, includes:

- identify important populations and sites on public land; determine habitat needs and implement policy to protect or enhance populations;
- identify important populations and sites on private land; prioritize and target sites for easement, acquisition, or voluntary implementation of habitat protection or enhancement;
- monitor long-term use and suitability of key sites in relation to land use trends.
- determine best forest management practices for Cerulean Warblers to enhance populations.

As part of this strategy, a regional land use analysis should be conducted to identify all remaining large forest block (e.g., ≥ 350 ha) and landscapes with high % forest cover (e.g., $> 70\%$) within this physiographic area. The largest forest blocks, especially those within well-forested landscapes, should be targeted for protection efforts. These large blocks represent the foundations from which conservation actions should begin for the mature forest suite of species in this physiographic area. Increasing the size of forest blocks should also be considered, especially in landscapes that are not highly forested (e.g., $< 70\%$ forest). Connecting smaller forest patches and improving area-to-perimeter ratios of narrow or oddly shaped patches should benefit the species in this habitat suite.

As yet untested approach to the long-term conservation of forest birds is the establishment of Bird Conservation Areas (BCA) within the forested landscape that maximize the chances of sustaining source populations of priority species. Such an approach would essentially superimpose an island or patch model onto a seemingly continuous landscape. Identification of potential BCAs would take into account present-day local distributions of priority

species, specific habitat relationships that optimize density or reproductive success, land ownership status, and prospects for long-term maintenance of desired habitat conditions. Land-management goals within BCAs would explicitly include sustainability of priority bird populations; i.e., these areas would sustain target populations for the physiographic area. Areas outside of designated BCAs might support similar habitats and bird populations, and might contribute substantially to the overall bird community, but they would not be *essential* to meeting specific population objectives for priority species. This basic approach is being developed and tested in patchily distributed grassland habitats in the Midwestern U.S. (refs).

A procedure for designating Bird Conservation Areas for forest birds in a region such as the Allegheny Plateau planning unit would involve the following steps:

- determine local optimum densities of priority species in suitable habitats.
- determine area required to support source population (e.g. 500 pairs) of priority species, assuming optimum habitat conditions.
- determine present distribution of priority species; e.g. using Breeding Bird Atlas or similar occurrence data.
- identify potential patches of suitable or optimal habitat, using GIS, that meet requirements of habitat type (e.g. forest type, elevation), minimum size, and known or suspected occupancy for each priority (focal) species.
- superimpose suitable habitat patches identified for multiple priority species to identify patches capable of supporting entire habitat-species suite.
- overlay land-ownership, conservation status, and other relevant features (e.g. using GAP analysis) to identify potential BCAs.
- work cooperatively with landowners, local conservation NGO's, state and federal agency personnel, municipal conservation commissions, land trusts, etc. to develop long-term habitat conservation plans for these areas.

This basic procedure is similar to that used for GAP Analysis, identification of focal areas within TNC's Ecoregions, and probably other conservation planning processes, but it has not been applied previously to PIF planning for forest birds. Note that if similar initiatives to identify conservation focus areas are ongoing within a physiographic area, then a modified approach could begin with already-identified areas (i.e., existing or target conservation lands), assessing their potential for supporting priority bird populations, and then following the above procedure to identify any additional areas that are needed to meet population objectives.

If BCAs are being identified in more than one forest type, then these processes should be coordinated, or perhaps combined. For example, BCAs can be identified for species of both oak-hickory and northern hardwood/mixed forests within the planning unit. If these forest types occur as distinct, large patches, then BCAs for each habitat-species suite could be distinct. If, however, forest types occur primarily as a mosaic over large landscapes (more likely), then particular BCAs might be selected that are large enough to meet the needs of species in both habitats.

In addition to considering landscape characteristics, managing for vegetation structure in individual forest stands can ensure that appropriate structural characteristics of the habitat are being maintained. Most of the priority species in this habitat suite respond positively to structural diversity at different heights, including dense nesting cover at the shrub and/or low-canopy levels and small canopy openings. If forest stands have reached a late-successional stage but have little shrub or mid-canopy vegetation and few breaks in the canopy, low-level management through selective cuts or thinning may improve habitat conditions. For example, selective logging and thinning of stands may create favorable vegetation conditions for species such as Wood Thrush, Worm-eating Warbler, Black-billed Cuckoo, and Black-throated Blue Warbler, all of which favor a dense deciduous understory. For Louisiana Waterthrush, conservation efforts should be targeted at headwater streams and wetlands of high water quality within large forest patches. In smaller forest tracts, maintaining at least a 100 meter buffer of mature forest cover along streamside and ravine habitat may make these areas suitable for this species.

Specific recommendations for species in this suite are given below under management options. In addition, a good list of landowner incentive programs are listed in Appendix 4 of this report and is separated out by habitat type. Landowners and managers can reference this section to locate programs that will help promote bird conservation through habitat acquisition and management and other conservation measures.

Important Bird Areas

Several Important Bird Areas that have been identified in the planning area contain important riparian-deciduous (oak-hickory) forest habitat and will be an important focus for implementation phase of the PIF conservation plans. For example, IBAs in the state of New York have been shown to contain 80% of the known breeding population of Cerulean Warbler, the top priority bird in this habitat suite. As a part of the IBA designation process conservation strategies for these sites will be produced. Important sites for birds occupying riparian-deciduous forest are (Wells 1998, Crossley 1999):

New York

- Allegheny State Park and Allegheny Reservoir-60,000 Acres; Public (NY State off. of Parks). Estimated 60% deciduous woods, 30% mixed woods, 5% shrub/scrub, 3% recreation areas, and 2% grassland. Six species of thrush and a diverse assemblage of wood warblers (20+ species) nest in the park. Highlights include Cerulean Warblers (100+ breeding pairs), and Red-shouldered Hawks (5+ breeding pairs).
- Ashokan Reservoir-8,000 acres; Public (NY DEC). Primarily lacustrine, surrounded by deciduous and mixed woods and non-tidal wetlands. Breeding Red-shouldered Hawks (6 pairs), as well as Great Blue Herons (10-30), Hooded Warblers (2-4 pairs), Cliff Swallows (50+ pairs), Barred Owls (4+ pairs), and a great diversity of other species.
- Bashakill Wildlife Management Area-2,100 acres; Public (NY DEC). Non-tidal wetlands and deciduous and mixed woods. Nesting Sharp-shinned Hawks, Cooper's Hawks, Northern Goshawks, and Red-shouldered Hawks.
- Connecticut Hill-11,000 acres; Public (NY DEC). Primarily deciduous woods and mixed woods with some coniferous woods, shrub/scrub and non-tidal wetland. Breeding species including Ruffed Grouse, Wild Turkey, Louisiana Waterthrush, Hooded Warbler, Yellow-rumped Warbler, Blue-winged Warbler, and Nashville Warbler.
- Franklin Mountain Hawkwatch-95 Acres; Private. Estimated 45% mixed woods, 30% grassland/abandoned farmland, 25% non-tidal wetlands. Highest fall tallies of Golden Eagles in the eastern U.S. (99 ind./season). Average annual counts Bald Eagles (19), Peregrine Falcons (7), Northern Harriers (79), Osprey (88), Sharp-shinned Hawks(448), Cooper's Hawks (46), Northern Goshawks (32) and Red-shouldered Hawks (72).
- Happy Valley Wildlife Management Area-8,756 acres; Public (NY DEC). Characteristic breeding bird communities of forested wetlands Red-shouldered Hawks breed high densities (28 nests found between 1985-87).
- Hemlock and Canadice Lakes-38,400 acres; Mostly private. Primarily mixed woods surrounding lakes. Breeding Sharp-shinned Hawks, Cooper's Hawks, Red-shouldered Hawks, Red-headed Woodpeckers, Cerulean Warblers, and Bald Eagle.
- Hi-Tor Wildlife Management Area-6,100 acres; Public (NY DEC). Primarily deciduous woods, some mixed woods. Supports breeding Cooper's Hawks, Black-billed Cuckoos, Yellow-bellied Sapsuckers, Blue-headed Vireos, Yellow-throated Vireos, Red-eyed Vireos, Yellow-rumped Warblers, Hooded Warblers, Ovenbirds, Mourning Warblers, Scarlet Tanagers. One Prothonotary Warbler was noted in summer 1997.
- Letchworth State Park-14,342 acres; Public (state and federal). 40% deciduous woods. Breeding Cooper's Hawks (5 pairs in 1996), Northern Goshawks (1 pr. in 1985), Cerulean Warblers (20 pr. in 1996), Red-shouldered Hawks (2 pr. in 1990) and Red-headed Woodpeckers (5 pr. in 1994).
- Long Pond State Forest-3,254 Acres; Public (NY DEC). Mixed woods with some large portions of grassland and shrub/scrub. The mature hardwood-hemlock forest supports breeding Red-shouldered Hawks.

- Pharsalia Woods-10,000 acres; Public (NY DEC). Deciduous woods with some large portions of coniferous plantations and mixed woods. Breeders include Red-shouldered Hawk, Northern Harrier, Yellow-rumped Warbler, Scarlet Tanager, Rose-breasted Grosbeak, Red-eyed Vireo, and Eastern Wood-Pewee.
- Ripley Hawk Watch-10,000 Acres; Public / Private. Grassland, cultivated fields, mixed woods and vineyards. This is a major spring hawk concentration location. High counts include 5965 Broad-winged Hawks, , 186 Red-shouldered Hawks, 1282 Sharp-shinned Hawks, 280 American Kestrels, 51 Bald Eagles, 9 Golden Eagles, 30 Merlins, 9 Peregrine Falcons, and 4240 Turkey Vultures.
- Salmon Creek-500 acres; Private/ land trust. Deciduous woods bordering a small creek. Site supports a major breeding concentration of Cerulean Warblers (46 pairs in 1997) and a diversity of other songbirds including Acadian Flycatchers (3 pairs in 1997), Hooded Warblers, Mourning Warblers, Blue-gray Gnatcatchers, Yellow-throated Vireos, Yellow-bellied Sapsuckers, and Dark-eyed Juncos.
- Wheeler's Gulf-65 Acres; Private. Mixed woods w/some deciduous woods, non-tidal wetlands and riverine habitats. Site supports an unusual diversity of breeding birds for the region including Cerulean Warbler (1-4 pr.), Acadian Flycatcher (4-6 pr.), Hooded Warbler (2-4 pr.), and many others.

Pennsylvania

- Conneaut Marsh-5,000 Acres; Public (PA Game Comm.). The state's largest emergent marsh complex, extensive scrub-shrub, emergent and forested and wetland types, deciduous coniferous, and mixed forest of various ages. Breeding species include Prothonotary Warbler and Common Nighthawk.
- Cussewago Bottom-4,200 Acres; Public (PA Game Commission). Bottomland forest and wetlands. Species include Cerulean Warbler, Kentucky Warbler, Hooded Warbler, Ovenbird, Scarlet Tanager and Northern Waterthrush. A high number of Neotropical migrants.
- Hickory Run State Park-15,500 Acres; Public (Dept. Cons. & Nat. Res.). A mixture of white pine, white birch, hemlock, shrub communities, variety of forest types. Species include Scarlet Tanager, Louisiana Waterthrush, Black-and-white Warbler, American Redstart, Ovenbird, Red-eyed Vireo & Least Flycatcher.
- Oil Creek Valley / Oil Creek State Park -7,075 Acres; Public (PA Dept. Cons. and Nat. Res.)/ Private. Flood plain wetlands, oak-hickory forest, and cool, steep hemlock ravines. Breeding species include Cerulean, Yellow-throated, Black-throated Blue, Black-and-white Warblers and Louisiana Waterthrush.
- Powdermill Nature Reserve-2,000 Acres; Private. Mixed and deciduous forest, woodland streams, managed grassland habitat and old fields. Species include Cerulean, Kentucky, and Hooded Warbler, Louisiana Waterthrush, Northern Parula.

Ohio

Many Important Bird Areas in Ohio have been nominated, but information on species present and habitat are currently unavailable (Table 3.3).

Management Options:

Landscape Level

Maryland Partners in Flight provides an excellent publication on habitat management guidelines for forest and other landbirds (Maryland PIF 1997). Maintaining the largest possible forest tracts are of primary importance, ideally at least 7,500 acres (3000 ha) for conservation. Construction and other activity and disturbance should be concentrated on the periphery to prevent fragmentation and edge effects and maintain the largest possible areas of suitable habitat for species that are area-sensitive.

Maryland PIF emphasize the importance of maximizing the amount of contiguous forest “interior” (forest area more than 100m from the forest edge) within each forest tract. Management and acquisition efforts should be targeted at less isolated forest patches and should promote the reforestation of gaps between forest patches. Increasing forest connectivity is likely to benefit the dispersal ability and habitat quality for many forest interior birds.

In addition to these general guidelines, Rosenberg et al. (1999b) provide minimum patch size requirements in regionally specific landscapes with different amounts of forest cover. Although these minimum areas were derived from data on Scarlet Tanagers, they most likely apply to a suite of forest-breeding species. In the Appalachian region, area requirements are relaxed in landscape blocks (1,000 ha) that are $\geq 50\%$ forested; tanagers and other forest birds will occur in nearly any size patch. In landscape blocks that are 30% forested, however, a minimum patch size of 60 ha is required to support breeding tanagers, and in a block that is only 20% forested, no single patch may be large enough to attract this species.

Publicly owned land such as national and state forests contain many of the remaining large patches of contiguous forest in the Allegheny Plateau. Management of these areas should emphasize the types of forest present (plant species composition, successional age, vegetation structure, habitat heterogeneity), patterns of habitat across the landscape (patch configuration and shape, patch size, distance between patches, amount of non-forest edge, juxtaposition of habitats), and forest cover (historical, current and potential future).

National forests and other large forest reserves will also contain shrub/early-successional and grassland birds, usually in smaller numbers. Maintaining their presence through periodic disturbance and management is important, especially in the Allegheny Plateau where grassland and early-successional species are a high conservation priority. Proper assessment of management options should incorporate the abundance of grassland and shrub-dependent species outside of the forest as well. Non-forest land should also be a part of a forest management plan targeted at conservation of forest species. Petit et al. (1995) suggest a sample management plan to help in assessment. Consideration of minimum area requirements of targeted population levels of forest birds as well as the habitat needs of “edge” species and those dependent on disturbance should be included.

Franzreb et al. (2000) suggest a perspective for forest management in different landscape patterns. Even-aged management may only be consistent with goals for conservation of forest birds in highly forested landscapes. Even-aged harvests are more extreme forms of local disturbance and may have a severe impact upon habitat suitability of surrounding forest in more agriculturally dominated regions. But even in more forested areas, attempts should be made to aggregate harvest areas and optimize cut shape and area to minimize forest fragmentation.

Ownership Level

Private land owners can play an important role in forest bird conservation within the context of their land ownerships and management objectives (Wigley and Sweeney 1993). Many of the priority bird species in this habitat suite are tolerant of moderate disturbance, and some such as Wood Thrush and Eastern Wood-Pewee may be dependent on some forms of disturbance to create forest openings and promote a dense understory. Various timber harvesting techniques on a small scale may be beneficial to these species. Other high-priority species, most notably Cerulean Warbler, may be intolerant of timber harvesting. An assessment of the species occupying a particular forest tract should be conducted before initiating a management action.

Locally, Maryland PIF (1997) suggest avoiding even the loss of small forests (<25 acres or 10 ha), especially along streams and riparian corridors where forests are scarce. These sites are important, perhaps critical, to the survival of migrating birds in many habitat suites. Removal of small woods that would improve the quality of grassland habitat may be a consideration for land managers, however.

Older forests often have higher densities of standing dead trees, or “snags”. Snags are a necessity for cavity nesting birds such as woodpeckers, which excavate their nests in them, as well as for secondary cavity nesters, which occupy these vacant holes afterward. Many species require snags for roosting and for feeding because dead trees are often host to a number of boring insects and grubs (Maryland PIF 1997).

Timber activity near forested riparian areas can negatively impact bird populations in these areas by reducing the overall forest cover and habitat distribution. Some species are easily extirpated for strips of riparian forest if strips are too narrow. Studies designed to ascertain specific recommendations for the suggested width of strips has yielded

a variety of results. Some suggest that riparian strips should be at least 60 meters on either side of a river in order to prevent extirpation of more area sensitive species, other suggest more or less. Maintaining riparian forest buffers of at least 100m is probably a good working rule.

Other forest management recommendations include promoting a diverse forest understory by controlling deer numbers through exclosures and hunting. Controlled burns can also promote forest regeneration and provide snags and other habitat characteristics that are important for fire- or gap-dependent native forest vegetation and some bird species.

Resources:

The proceedings of several major conferences and groups have been published and offer major insights into the management of Neotropical migratory birds, and especially forest species (Martin and Finch 1995, Finch and Stangel 1993, Hagan and Johnson 1992). DeGraff and Rudis (1986) and DeGraff et al. (1992) are specific to the Northeast. Also read Maryland PIF (1997) for more specific recommendations tailored to different types of land use categories including timber harvest areas and private woodlots.

Species-specific management recommendations are available online through the Nature Conservancy's Wings of the Americas website. They provide links to additional species management information available from the Northern Prairie Wildlife Research Center of the U.S. Geological Survey, Biological Resources Division, the Army Corps of Engineers, Waterways Experiment station, and the Wilderness Society's (TWS) Migratory Bird Initiative. They also reference the appropriate publication number for the Birds of North America series and provide links or contact information maintained by Partners in Flight to species accounts developed by the US Fish and Wildlife Service.

Wings Info Resources / Species Information and Management Abstracts:

<http://www.tnc.org/wings/wingresource/birddata.htm>

Research and monitoring needs: Within the planning unit, populations of at least 8 of the 12 priority species within this habitat appear adequately monitored by the BBS. Forest raptors are not well monitored, however, along with species with highly patchy distributions in the region, such as Cerulean Warbler and Red-headed Woodpecker. Long-eared Owls breed in small numbers in the planning unit according to atlas data, but are unreported by the BBS. For these species, targeted inventory and monitoring efforts will be necessary to implement and evaluate the conservation objectives in this plan. A preliminary atlas of Cerulean Warbler populations has been completed (Rosenberg et al. 2000), but additional surveys and a follow-up protocol to monitor important sites are still needed.

Monitoring programs at Important Bird Areas are in the planning stages for several state programs. They will begin after an inventory has been taken and will be carried out by volunteers. These efforts may or may not well cover Partners in Flight priority species, but rather will be targeted at species within the IBA that met criteria in identification of the IBA. For example, smaller populations of forest birds could be overlooked in favor of monitoring waterfowl populations at a large wetland if manpower is low.

Specific research and monitoring needs for this habitat suite include:

- Determine range of suitable habitats and identify present breeding sites for Cerulean Warbler in this region; develop better understanding of site conditions that attract these birds in this physiographic area;
- Determine factors limiting Wood Thrush, Louisiana Waterthrush, Black-billed Cuckoo, and Worm-eating Warbler populations in this region and causes of population declines;
- better understanding of role of stand age and stand structure on habitat quality and ultimately survival and reproductive success of priority species;
- Assess the effects of various logging practices (especially selection and shelterwood cuts) on occurrence, breeding density, and nesting success of the priority species in this habitat suite;
- Monitor reproductive success of this suite of species at different locations throughout region to better understand where forest fragmentation causes problems and where it does not;
- Determine relative importance and use of other habitat types during the post-fledging period prior to migration. Some information has now been collected on this topic for Wood Thrushes, but little is known for most species;

- Assess sensitivity of species in this habitat suite to pesticides currently being used to control gypsy moths and other insect pest species;
- Studies of reproductive success, lingering impacts of pesticide use, prey population levels, habitat characteristics of nest sites and preferred foraging areas, and interactions with competitors are needed for most woodland raptors, including Cooper's Hawk, Barred Owl, and Red-shouldered Hawk;
- better methods for monitoring species that use patchily distributed components of the forest, such as treefall gaps, small wetlands, snags.

Outreach: An estimated 80% of forest land in the eastern United States is privately owned. Outreach targeted at owners of private woodlots and large timber companies to manage (or not manage) their land to benefit forest birds could benefit these species. In the Allegheny Plateau the Cerulean Warbler is of particular concern. It is currently under consideration for federal threatened listing by the US Fish and Wildlife Service. Proactive management on private lands would benefit conservation efforts and landowner interests.

Another tool for forestland conservation with tremendous potential is conservation of open space. Conservation of open space has benefits for property tax stability, eco-tourism and maintenance of nearby property values (Kerlinger 2000). The state of New York has a state open space plan (NYDEC 1998) that outlines regional priorities for state land acquisition. Wildlife and ecosystem conservation may act as supporting criteria in qualifying a land for acquisition and increasing its priority. Unfortunately, many current priorities are targeted at purchasing access areas for recreational activities and little money is even indirectly targeted at wildlife conservation. Continuing effort to include wildlife conservation priorities in the agenda may yield great rewards.

D. Mountaintop-Coniferous Forest

Importance and conservation status: The recognition of Bicknell's Thrush as a separate species (Oullet 1993, AOU 1995) has elevated the importance of its primary habitat, stunted high-elevation conifers, to a top regional conservation priority (Rosenberg and Wells 1995). This habitat type occurs naturally at high elevations (>3,300 feet), occurring on at least 14 peaks throughout the Catskill Mountains. Its distribution is therefore naturally fragmented at the landscape level, with habitat patches ranging in size. All of this habitat in the Catskills falls within the Catskill Forest Preserve, and this entire area has been designated as an Important Bird Area, as well as an official Bird Conservation Area by the state of New York. Even so, threats exist in the high Catskills, primarily due to proposed expansion of private ski resorts on Hunter Mountain. Soil-calcium depletion due to acid deposition is another potential threat to breeding birds in this habitat.

Although mountaintop habitat suitable for Bicknell's Thrush does not occur south of the Catskill Mountains, similar boreal-type habitats exist in the high Pocono Mountains of northeastern Pennsylvania, and in a few other localities at higher elevations on the Allegheny Plateau. Often associated with bogs, these stunted spruce stands support other species which co-occur with Bicknell's Thrush in the Catskills, most notably Yellow-bellied Flycatcher, but also Blackpoll Warbler, and Swainson's Thrush. Observers in Pennsylvania continue to search for Bicknell's Thrush in these areas. Since the early 20th century the highland bogs that Yellow-bellied Flycatchers prefer have been mined for peat and many breeding populations have been destroyed (McWilliams and Brauning 2000).

Associated priority species: BICKNELL'S THRUSH, Yellow-Bellied Flycatcher, Blackpoll Warbler.

Within the Allegheny Plateau, the stunted conifer woodlands that support Bicknell's Thrush are limited to the Catskill High Peaks of New York. This area is about 90% forested, mainly with northern hardwoods on the slopes and spruce and fir at the summits. Bicknell's Thrush is found only at these summits of the highest peaks which, unlike the Adirondacks of New York, are forested to their zenith. Bicknell's Thrush has been known to breed on 14 peaks in the Catskill Mountains, and in fact the type specimen of this cryptic species was collected on Slide Mountain on 15 June, 1881.

Yellow-bellied Flycatchers usually breed above 1700 ft. in poorly drained areas such as bogs or open swamps overshadowed by scattered canopy trees including conifers underlain with sphagnum moss (McWilliams and Brauning 2000). They occur in isolated wetlands across north-central and northeastern Pennsylvania and in the Catskills. The largest, most stable population in Pennsylvania (<12 pairs) occurs in the complex of swamps in

Wyoming County, including the Tionesta Natural Area and Allegheny National Forest. A decline in the population of Yellow-bellied Flycatcher may be partially attributed to beaver activity that causes extensive flooding and to state agencies' management activities (Mellon 1990).

Habitat and population objectives: This habitat type is not sampled by standard Breeding Bird Survey methodology, so we have no estimates of past and present-day populations in this habitat suite. Nevertheless, habitat-based objectives for this suite are relatively straightforward, in that protection of virtually remaining suitable habitat will be necessary to maintain populations of the two focal species within this planning unit.

OBJECTIVE 1: Protect all examples of mountaintop conifer forest in the Catskill Peaks, maintaining viable populations of Bicknell's Thrush on the 14 peaks on which they now occur.

OBJECTIVE 2: Protect all remaining high elevation and boreal spruce-bog habitat suitable for Yellow-bellied Flycatcher (and Blackpoll Warbler), maintaining populations of this species at a minimum of xx sites in the Catskill Mountains and northern Pennsylvania (no net loss).

Implementation strategy: Protection of remaining high elevation and conifer-bog habitat falls mostly within the jurisdiction of state and federal land-management agencies. Management of these public lands will need to be compatible with sustaining populations of high priority bird species. Clearly, maintaining currently populations of Yellow-bellied Flycatchers in the planning unit will require protection of the few sites where this species breeds. Several of these sites are within protected areas such as the Catskill Forest Preserve, the Tionesta Natural Area and the Allegheny National Park. Management efforts in these areas should seek to maintain or enhance upland bogs where this species occurs and where habitat restoration may attract new populations. Such efforts may be specifically targeted to historic breeding sites in the Poconos where this species has historically bred.

Elements of this conservation strategy include:

- identification of most critical habitat patches, using GIS and ground-based surveys;
- identification of real and potential threats to these areas from human disturbance, as well as from conflicting management activities;
- targeting habitat patches on private lands for conservation easement or possible acquisition;
- identification and enforcement of laws and regulations pertaining to high elevation mountaintops and wetlands;
- partnering with non-governmental conservation organizations (e.g. TNC, National Audubon) to foster conservation planning and actions in critical habitat patches (e.g. Important Bird Areas).

Important Bird Areas

The site-based approach of the Important Bird Area program may be especially appropriate in the conservation of such highly localized species as Bicknell's Thrush and Yellow-bellied Flycatcher in the Allegheny Plateau. Some Important Bird Areas that have been identified in the planning unit that contain important boreal/ mountaintop habitat and will be an important focus for implementation phase of the PIF conservation plans. As a part of the IBA designation process, conservation strategies for these sites will be produced. IBAs with boreal/mountaintop birds are (Wells 1998, Crossley 1999):

New York

- Catskill Peaks-unknown acreage; Public (NY DEC) / Private. Peaks over 3500 feet support breeding Bicknell's Thrushes (27 territories in 1997, breeding records for 14 peaks), Blackpoll Warblers (22-25 territories in 1997) and Yellow-bellied Flycatcher (11 territories in 1997).

Pennsylvania

- Dutch Mountain Wetlands Complex – SGL 57-652 Acres; Public (PA Game Comm.). Boreal conifer swamps and shrub-scrub wetlands with Hemlock, black spruce, larch, red maple, black gum, and yellow birch. Breeding Yellow-bellied Flycatcher (6+pairs).

- Tionesta Natural Scenic Area-4,131 Acres; Public (USFS-Allegheny National Forest). Old-growth beech hemlock forest with maple and cherry. Breeding Yellow-bellied Flycatcher.
- Wyoming State Forest-42,000 Acres; -Hardwood-hemlock forest - little forest edge, peatlands. Breeding Yellow-bellied Flycatcher.

Management Options: Specific management recommendations for Bicknell's Thrush and other mountaintop and bog species have not yet been identified. Possible options (subject to research) to enhance the populations of focal species in this habitat could include:

- regulation of human activity and disturbance during the breeding season;
- regulation or curtailment of peat mining in spruce bogs;
- encouragement of beaver activity in high elevation wetlands;
- judicious predator control, if red squirrel populations are determined to limit reproductive success of Bicknell's Thrush;
- judicious use of prescribed fire or timber harvest to maintain open boggy habitats;
- restoration of previously productive bog or other spruce habitats.

Research and monitoring needs: Yellow-bellied Flycatcher and Bicknell's Thrush have extremely localized breeding populations in the planning unit. BBS routes do not report either species. Monitoring efforts directed at these species will require directed efforts in the Allegheny Plateau. In addition, because these species often breed in remote locations, far from human habitation censuses and inventories appropriate habitat may reveal previously unreported breeding activity.

Monitoring programs at Important Bird Areas are in the planning stages for several state programs. They will begin after an inventory has been taken and will be carried out by volunteers. These efforts may or may not well cover Partners in Flight priority species, but rather will be targeted at species within the IBA that met criteria in identification of the IBA. Bicknell's Thrush and Yellow-bellied Flycatcher are state listed species and will likely be part of monitoring efforts at IBAs.

Specific research and monitoring needs for this habitat suite include:

Outreach: ??? Waiting to hear from Northern Catskills Audubon and DEC

E. Northern hardwood-mixed forest

Importance and conservation status: Northern hardwood and mixed forests, usually dominated by sugar maple, beech, and birch, represent the most widely distributed habitat-type within the planning unit. As mature softwoods (especially white pine) were extensively harvested in the past century, hardwood forests have regenerated over most of the region during the past 80 years. Today, this forest type covers roughly 36% of the planning unit, or some 4.4 million ha (10.7 million acres). It is dominant in the more northern and higher elevation portions of the physiographic area, including the transition zone along the base of the Adirondack Mountains. This forest type includes a significant component of white pines in many areas, and also hemlock-dominated forests in ravines and on north-facing slopes. The region is also dotted with plantations of Norway and white spruce, as well as red, white, and Scotch pines, that were planted in the early and mid-twentieth century. These plantations have matured and today provide extensive habitats for many coniferous-forest nesting bird species.

Because many bird species typical of northern hardwood and coniferous forests are near the southern limit of their breeding distribution in the Allegheny Plateau, this habitat type is not as high a priority for conservation action as are the more southerly Appalachian oak-dominated forests. Nevertheless, the large areas of northern hardwood forest support large populations of many forest-generalist species, as well as significant populations of species that are a high priority in more northerly physiographic areas. Hemlock forests are particularly important to these northern forest species, especially in Ohio where the small populations are completely dependent on this forest type. Conservation planning should focus on extensive tracts of representative forest types, and should address the

microhabitat needs of species showing regional or local declines. A majority of high-priority species in this habitat are dependent on particular characteristics of the forest understory.

Associated priority species: CANADA WARBLER, BLACK-THROATED BLUE WARBLER, Wood Thrush, Black-billed Cuckoo, Louisiana Waterthrush, Scarlet Tanager, Eastern Wood-pewee, Least Flycatcher, Rose-breasted Grosbeak, Sharp-shinned Hawk, Northern Goshawk, Red-shouldered Hawk, Northern Waterthrush, Northern Saw-whet Owl, Magnolia Warbler, Winter Wren, Hermit Thrush.

The two focal species in this suite are typical of northern hardwood and mixed forest associations throughout their range, and both are widely distributed at low densities throughout the northern and higher elevation portions of this physiographic area. Both of these warblers are associated with dense understory conditions, especially favoring deciduous shrubs such as hobblebush and rhododendron. With their similar distributions and habitat preferences, it is somewhat puzzling why Canada Warblers continue to decline nearly throughout their range (3.5% per year in the Allegheny Plateau), whereas Black-throated Blue Warbler populations appear stable. Perhaps the answer lies in their very different winter distributions and migration pathways.

Some species in this suite (e.g. Wood Thrush, Scarlet Tanager, Eastern Wood-Pewee) are forest generalists, occurring also in the oak-hickory forests further south, whereas others (Least Flycatcher, Rose-breasted Grosbeak) are more strictly associated with northern hardwood forests. The remaining eight species are included on the basis of being legally listed in at least one state in this region. Magnolia Warbler, Winter Wren, and Hermit Thrush are common in the New York and Pennsylvania portions of the Allegheny Plateau, but appear on the Ohio state list, highlighting the special status of remnant hemlock forests in that state. The status of Northern Saw-whet Owl is uncertain, but recent efforts to survey for this species has revealed a more widespread distribution (at least in PA) than previously thought (D. Gross, pers. communication).

Habitat and population objectives: Based on extrapolations from BBS relative abundances, VERY ROUGH estimates of population size for priority species in this habitat suite can be derived (Table 4.6). These crude estimates are most useful in illustrating the relative population sizes of various species and, perhaps, giving order-of-magnitude figures for setting population objectives for the region.

Table 4.6. Population estimates and targets (number of pairs) for priority species of northern hardwood and mixed forest habitats in the Allegheny Plateau physiographic area. Percent of Atlas blocks based on number of 5-km blocks in which the species was reported (from Rosenberg and Wells 1995, appendix 3).

Species	BBS population	% lost Since 1966	Population target	% Atlas blocks		
				NY	PA	OH
Canada Warbler	13,500	> 50%	28,000	45	25	4
Wood Thrush	495,000	> 50%	1,000,000	98	89	100
Black-billed Cuckoo	47,000	> 50%	100,000	40	33	36
Louisiana Waterthrush	16,000	stable	16,000	35	26	36
Scarlet Tanager	270,000	32%	400,000	90	90	99
Rose-breasted Grosbeak	225,000	stable	225,000	95	84	91

For species that have declined significantly during the BBS period, a population target may be set to approximate pre-BBS population levels; an annual decline of 2.4% per year corresponds with a 50% loss over 30 years. For species suffering a 50% or greater loss since 1966, this plan calls for roughly a doubling of present-day populations as a practical objective. For species showing stable or unknown trends, population targets are roughly rounded up from current population estimates. Note that the relative abundances used to for these estimates are averages across all BBS routes in the physiographic area using data from 1990-1998. For more details on methods used for calculating populations and targets, (see Appendix 3).

OBJECTIVE 1. Reverse declines and strive to support 28,000 pairs of Canada Warblers throughout the physiographic area.

OBJECTIVE 2. Stabilize or reverse declining population trend for Wood Thrush; maintaining long-term population of 1,000,000 breeding pairs (shared with deciduous forest objective).

OBJECTIVE 3. Maintain 50 pairs of Northern Goshawk, 400 pairs of Sharp-shinned Hawks and 1,400 pairs of Red-shouldered Hawks as stable regional populations.

Assumptions: (1) maintaining suitable habitat (including habitat structure and quality) for Wood Thrush, Canada and Black-throated Blue warblers will be sufficient to support sustainable populations of most other birds in this habitat suite; (2) maintaining adequate area for forest-breeding raptors will meet requirements of other potentially area-sensitive species.

Based on published density estimates, roughly 3.2million ha (8 million acres) of northern hardwood forest is required to support the entire habitat-species suite (e.g. 1 million pairs of Wood Thrush), with 60,000 ha (150,000 ac) suitable to support 28,000 pairs of Canada Warblers.

Implementation strategy: Implementing the broad objectives for this habitat-species suite will require a comprehensive forest management plan for the entire Allegheny Plateau region that acknowledges the long-term importance of maintaining large source populations of priority forest birds. Elements of such a plan that are most relevant to the high-priority birds include:

- maintaining a balance of forest-age classes, including adequate amounts of mid-successional as well as late-successional forest
- ensuring long-term tree-species composition; i.e. prevent loss of particular species from stands, such as eastern hemlock, white pine, or American beech, through disease or selective harvest.
- ensuring adequate structural diversity, especially regarding understory components (shrubs, treefalls); monitor effects of natural disturbances (e.g. wind storms) as well as deer browsing and forestry practices
- set maximum allowable levels of forest fragmentation due to forestry practices or planned development; e.g. do not allow any 10,000 km² landscape to fall below 70% forest cover
- identify and designate Bird Conservation Areas (BCA), within which long-term sustainability of priority bird populations is a primary management objective.

A complete implementation strategy for forests in this region will include objectives for both northern hardwood and oak-hickory forests. Indeed many of the objectives for priority forest species will involve combined efforts in both forest types. See comments under oak-hickory forest above for additional details on a general conservation strategy for regional forests.

Specific actions directed at the focal species in northern hardwood forest include:

- determine specific habitat requirements and limiting factors for Canada and Black-throated Blue warblers; determine causes of population decline of Canada Warbler;
- promote development of forest understory layer, through management and protection from over-browsing by white-tailed deer;
- map distribution of hemlock forest and determine protection status of important large tracts;
- assess health status of hemlocks throughout the region and devise a strategy to prevent loss due to disease;
- targeted survey and monitoring program for forest raptors and owls; build upon PA surveys for N. Saw-whet Owl (D. Gross) throughout the region;
- determine and apply minimum area requirements for Northern Goshawk in regional forest planning;
- assess value of exotic spruce and pine plantations to priority species; include conifer plantations in regional forest planning.

A list of landowner incentive programs are listed in Appendix 4 of this report and is separated out by habitat type. Landowners and managers can reference this section to locate programs that will help promote bird conservation through habitat acquisition and management and other conservation measures.

Important Bird Areas

Some Important Bird Areas that have been identified in the planning unit that contain important northern hardwood-mixed and coniferous forest habitat and will be an important focus for implementation phase of the PIF conservation plans. As a part of the IBA designation process, conservation strategies for these sites will be produced. IBAs with northern hardwood-mixed forest bird species are (Wells 1998, Crossley 1999):

New York

- Catskill Peaks-unknown acreage; Public (NY DEC) / Private. Above 3,500 feet, primarily coniferous woods; below 3500 feet primarily deciduous and mixed woods. Breeding Swainson's Thrushes, Hermit Thrushes, Yellow-bellied Flycatchers, Myrtle Warblers, Magnolia Warblers, Dark-eyed Juncos, White-throated Sparrows.
- Connecticut Hill-11,000 acres; Public (NY DEC). Primarily deciduous woods and mixed woods with some coniferous woods, shrub/scrub and non-tidal wetland. Northern Goshawk, Hermit Thrush, Red-breasted Nuthatch, Acadian Flycatcher, Black-throated Green Warbler, Prairie Warbler, Canada Warbler.
- Happy Valley Wildlife Management Area-8,756 acres; Public (NY DEC). Mixed deciduous/coniferous forests. Blackburnian Warblers are common breeders in coniferous plantations on site.
- Hemlock and Canadice Lakes-38,400 acres; Mostly private. Primarily mixed woods surrounding lakes. Northern Goshawk is a breeder.
- Hi-Tor Wildlife Management Area-6,100 acres; Public (NY DEC). Limited coniferous woods. Common Ravens, Red-breasted Nuthatches, Wood Thrushes, Hermit Thrushes, Magnolia Warblers, Black-throated Blue Warblers, Black-throated Green Warblers, Blackburnian Warblers, Canada Warblers, Purple Finch and Northern Goshawk.
- Keeney Swamp State Forest-2,170, Public (NY Dept. Env. Cons.) /Private. Estimated 30% deciduous woods, 20% coniferous woods. Native stands of Balsam Fir. Hosts Northern Goshawk, Cooper's Hawk, Saw-whet Owl, Red-breasted Nuthatch, Red-shouldered Hawk (breeding noted in 1997), Common Raven, Golden-crowned Kinglet, Canada Warbler, Chestnut-sided Warbler, Mourning Warbler, Blackburnian Warbler, and White-throated Sparrow.
- Pharsalia Woods-10,000 acres; Public (NY DEC). Deciduous woods with some large portions of coniferous plantations and mixed woods. Characteristic breeders include Swainson's Thrush, Hermit Thrush, Veery, Northern Goshawk, Sharp-shinned Hawk, Cooper's Hawk, Mourning Warbler, Canada Warbler, Blackburnian Warbler, Black-throated Blue Warbler, Black-throated Green Warbler, Magnolia Warbler, and rarely Red Crossbill, White-winged Crossbill, Pine Siskin, Pine Grosbeak.

Pennsylvania

- Callen Run Research Area-2,500 Acres; Public (PA Dept. Cons. Nat. Res.). -Red-oak, mixed Hardwoods, and hemlock secondary forest. Species include Magnolia Warbler, Rose-breasted Grosbeak, Blackburnian Warbler, Veery, Whip-poor-will, Cerulean Warbler, and Black-billed and Yellow-billed Cuckoo.
- Cook Forest State Park-6,668 Acres; Public (PA Dept. Cons. Nat. Res.). Old-growth forest, dominant second-growth mixed forests and riparian flora. Blackburnian Warbler 100+ pairs, Whip-poor-will, Barred Owl, Red-breasted Nuthatch, Brown Creeper, Hermit Thrush, Solitary Vireo, N. Parula, White-winged Crossbills, N. Goshawk, Swainson's Thrush and 75+ pairs of Black-throated Blue Warbler.
- Dutch Mountain Wetlands Complex – SGL 57-652 Acres; Public (PA Game Comm.). Boreal conifer swamps and shrub-scrub wetlands with Hemlock, black spruce, larch, red maple, black gum, and yellow birch. Breeding species include Barred Owl, Pileated Woodpecker, Scarlet Tanager, Sharp-shinned Hawk, Yellow-bellied Flycatcher, Canada and Nashville Warbler, Northern Saw-whet Owl and Northern Waterthrush.

- Hemlock Hill Research Area-350 Acres; Private. Mixed woodlands (beech, maple, hemlock), mature forest grading to pole timber, and fields in the early stages of succession. Carolinian to Boreal forest species. Large breeding populations of Solitary Vireo, Red-eyed Vireo, Hooded Warbler, Blackburnian Warbler and Hooded Warbler (75+pairs).
- Hickory Creek Watershed-8,663 Acres; Public (USFS-Allegheny Nat. For.). Includes mature beech/maple forest and hemlock or mixed hardwood/hemlock stands. Species include Great-crested Flycatcher, Least Flycatcher, Red-eyed Vireo, Rose-breasted Grosbeak, Veery, Swainson's Thrush, Black-throated Green and Blue Warblers, Magnolia and Blackburnian Warbler.
- Hickory Run State Park-15,500 Acres; Public (Dept. Cons. & Nat. Res.). A mixture of white pine, white birch, hemlock, shrub communities, variety of forest types. Species include Canada Warbler, Veery, Hermit Thrush and Black-throated Green Warbler.
- Long Pond Preserve, Barrens-15,000 Acres; Public (PA Game Commission)/ Private. Conifer plantations, upland forest areas of maple, oak and chestnut. Dry and wet barrens. Breeders include Alder Flycatcher, Veery, Cedar Waxwing, Blue-headed vireo, Ovenbird, Scarlet Tanager, Blackburnian Warbler, Black-and-white Warbler, American Redstart, N. Waterthrush, and a large population of Nashville Warbler.
- Oil Creek Valley / Oil Creek State Park -7,075 Acres; Public (PA Dept. Cons. and Nat. Res.)/ Private. Flood plain wetlands, oak-hickory forest, and cool, steep hemlock ravines. Species include Cerulean, Yellow-throated, Black-throated Blue, Black-and-white Warbler and Louisiana Waterthrush.
- Pine Creek Gorge Natural Area-12,600 Acres; Public (Dept. Cons. Nat. Res.). Red and white oak, northern hardwoods, white pine and hemlock. Breeders include Black-throated Blue Warbler, Scarlet Tanager, Swainson's Thrush and Red Crossbill.
- Pocono Lake Preserve-5,000 Acres; Private. An artificial lake surrounded by native northern hardwood forest and conifer stands; scattered boreal swamps and shrub swamps. Breeders include Canada Warbler, Blackburnian Warbler, White-throated Sparrow, Purple Finch, Yellow-bellied Sapsucker, Yellow-bellied Flycatcher (historical) Northern Saw-whet Owl, Red-breasted Nuthatch and Magnolia Warbler.
- Promised Land SP, Bruce Lake Natural Area-2,971 Acres, Public (PA Dept. of Cons. and Nat. Res.). Wetlands and balsam/fir swamps with surrounding coniferous woods. Species include Black-throated Blue Warbler, Magnolia Warbler and Eagle and attempts are being made to attract Osprey.
- Quehanna Wild Area-50,000 Acres; Public (PA Dept. Cons & Nat. Res.) -Expansive forests-wide variety of age classes and forest types: mixed oak, northern hardwood, red maple, aspen, gray birch, oak, white pine, hemlock and spruce. Species include Cerulean Warbler, Eastern Wood-pewee, Black-throated Blue Warbler, Pine Warbler, Golden Eagle, Ovenbird and Rose-breasted Grosbeak.
- Ricketts Glen SP, Crevling Lake, Splashdam Pond SGL 13-23,050 Acres; Public (PA Dept. Cons. & Nat Res./PA Game Comm.). Coniferous species: old-growth white hemlock-white pine forest. Swamps and shrub/scrub. Breeding species are Black-throated Blue Warbler, Acadian Flycatcher, Pileated Woodpecker, Barred Owl, Northern Waterthrush, Winter Wren, Least and Acadian Flycatchers, Northern Goshawk and Bald Eagle.
- Southern Sprout State Forest-100,000 Acres; Public (Dept. Cons. & Nat. Res.). A large, remote northern hardwood forest-mild, mixed forest types. Species include Cerulean Warbler, Eastern Wood-pewee, Least Flycatcher, Black-and-white Warbler, Pine Warbler, Black-throated Blue Warbler and Rose-breasted Grosbeak.
- Tamarack Swamp-300+ Acres. Public (PA Dept. Cons. & Nat. Res.)/ Private. Hemlock, spruces and balsams. Species include Sharp-shinned Hawk, Broad-winged Hawk, Ruffed Grouse, , Black-billed Cuckoo, Magnolia Warbler, Canada Warbler, Northern Waterthrush and Rose-breasted Grosbeak.

- Tionesta Natural Scenic Area-4,131 Acres; Public (USFS-Allegheny National Forest). Old-growth beech hemlock forest with maple and cherry. High densities of breeding Black-throated Blue and Blackburnian Warbler, Northern Goshawk (2 pairs), breeding Yellow-bellied Flycatcher and the state's highest density of Swainson's Thrush.
- Upper Delaware Scenic River-38,400 Acres; Public (Nat. Park Service)/ Private. Riparian woodland, fields, young scrub, hillsides, rhododendron and laurel thickets, bogs and wetlands. Red and white oak, sugar maple and hemlock dominate. Species include Canada Warbler, Northern Goshawk, Northern Waterthrush, Alder Flycatcher breed here and the site is an important Bald Eagle wintering location.
- Wyoming State Forest-42,000 Acres; -Hardwood-hemlock forest-little forest edge, peatlands. Breeders include Black-throated Green and Black-throated Blue Warbler Blackburnian Warbler, Acadian Flycatcher, Canada Warbler, Least Flycatcher, Northern Waterthrush, Northern Goshawk, Northern Saw-whet Owl.
- Yellow Creek State Park -3,140 Acres; Public (PA Dept. of Nat. Res.). Marsh habitat with surrounding forest, mixed woodlands. Species include Canada Warbler, Louisiana Waterthrush, Hooded Warbler, Blue-headed Vireo Horned Lark, American Pipit, Brown Creeper.
- Youghiogheny Valley, Ohiopyle State Park-19,000 Acres; Public (Dept. Cons. & Nat. Res.). Mixed decid. forest and open meadows. Species include Worm-eating and Hooded Warbler, Northern Parula, Whip-poor-will, Eastern Wood-pewee, Black-throated Blue Warbler, Ovenbird, Scarlet Tanager, Acadian Flycatcher, Yellow-throated Vireo and Cerulean Warbler.

Ohio

Many Important Bird Areas in Ohio have been nominated, but information on species present and habitat are currently unavailable (Table 3.3).

Management Options: Most of the priority species in northern hardwood forest habitat have been shown to respond positively to various silvicultural practices, and only one species (Northern Goshawk) may require very large blocks of mature forest. In particular, Canada and Black-throated Blue Warbler populations were enhanced by modest timber harvesting in Maine (Hagan and Grove, 1995). Similarly, Webb et al. (1977) found Canada Warblers increased following partial harvesting in the Adirondacks, whereas Black-throated Blue Warbler was neither positively nor negatively effected. In contrast, in eastern Maine, Derleth et al. (1989) reported that numbers of Black-throated Blue Warbler were significantly higher in stands treated with small clearcuts than in uncut controls. Germaine et al. (1997) found that abundance of Black-throated Blue Warblers and Wood Thrushes were highest in plots 50 m from small clearcuts.

No single silvicultural practice benefits all species of Neotropical migrant birds (DeGraaf et al. 1993); rather, forest management activity can benefit most species at some time in the rotation cycle. Strong associations of dense understory to populations of Black-throated Blue and Canada Warbler (Holmes 1994, Conway 1999) suggests that certain forest harvesting practices (on appropriate sites), like selective cutting or group selection, could be especially useful at creating or maintaining suitable habitat. In addition, control of white-tailed deer populations may be an important component of a strategy to promote understory regeneration.

Species-specific management recommendations are available online through the Nature Conservancy's Wings of the Americas website. They provide links to additional species management information available from the Northern Prairie Wildlife Research Center of the U.S. Geological Survey, Biological Resources Division, the Army Corps of Engineers, Waterways Experiment station, and the Wilderness Society's (TWS) Migratory Bird Initiative. They also reference the appropriate publication number for the Birds of North America series and provide links or contact information maintained by Partners in Flight to species accounts developed by the US Fish and Wildlife Service.

Wings Info Resources / Species Information and Management Abstracts:

<http://www.tnc.org/wings/wingresource/birddata.htm>

Research and monitoring needs: Within the planning unit, populations of 14 of the 16 focal species within this habitat appear adequately monitored by the BBS with a minimum of 27 of 99 possible routes reporting for those species. Northern Goshawk and Northern Saw-whet Owl went unreported by BBS observers while atlas results show significant breeding populations in the planning unit. Monitoring of these species may require directed efforts.

Monitoring programs at Important Bird Areas are in the planning stages for several state programs. They will begin after an inventory has been taken and will be carried out by volunteers. These efforts may or may not well cover Partners in Flight priority species, but rather will be targeted at species within the IBA that met criteria in identification of the IBA. For example, small grasslands that are a part of a large wetland complex harboring large populations of wintering waterfowl may lack priority if manpower is low.

Several specific needs are outlined below that form a basis for greater understanding and conservation of this suite of species.

- investigate specific habitat needs (and causes of declines) for Canada Warbler; why, for example, is Canada Warbler declining while Black-throated Blue Warbler is stable, if both require shrubby understory of mature forest?
- better understanding of landscape-level effects of land-use practices on forest bird populations
- better understanding of role of stand age and stand structure on habitat quality and ultimately survival and reproductive success of priority species.
- better methods for monitoring species that use patchily distributed components of the forest, such as treefall gaps, small wetlands, snags.
- catalog the number, size and arrangement of conservation lands within the planning unit and complete BCA needs (as described above); develop region-wide monitoring program targeted for high priority forest birds.

Outreach: Increased public awareness of forest birds will be necessary for full implementation of this conservation plan. This can be achieved through PIF state working groups, as well as programs by NGOs such as National Audubon Society's Important Bird Areas Program. Awareness among professionals even outside avian conservation is good largely because of such high profile initiatives as PIF. State PIF working groups should include professionals from organizations and agencies whose mandate covers forested habitats. Keeping working groups abreast of the latest information on conservation of these species should remain a focus. Additional partners should be sought to help meet monitoring and perhaps atlas needs. This habitat holds some of the most attractive species which could be used to encourage participation in birding and ultimately capable volunteer for citizen science projects and other volunteer opportunities.

F. Freshwater Wetland

Importance and conservation status: This habitat suite represents a continued nationwide concern for wetland habitats and their potentially vulnerable species. None of the species in this habitat suite score extremely highly in the PIF prioritization system, but a disproportionately large number of wetland species are found on state endangered species lists. Wetland species identified in this PIF plan depend on the same habitats that waterfowl, colonial-nesting waterbirds and other economically important species depend on. Conservation and management actions directed at waterfowl or other wetland values have not always considered effects on nongame bird species, however.

The amount of freshwater wetlands that have been lost or degraded during the last century is huge. The greatest threats to most species in this habitat suite are continuing loss and alteration of wetland habitat through draining, dredging, filling, pollution, acid rain, agricultural practices, and siltation. Various contaminants (e.g., pesticides, insecticides, heavy metals, acid deposition, etc.) from industrial, agricultural, and urban/suburban sources can degrade wetland ecosystems and impair reproductive abilities of the birds. The size of wetlands is also an important consideration for some of the priority species in this habitat suite. Many of these species occur more often and at higher abundances in larger wetlands. Loss of wetland habitat continues to be the primary concern for the species of this habitat suite, and preservation of existing wetland sites should be the first priority for conservation actions in this habitat type.

The New York Department of Environmental Conservation has done an extensive inventory of status and trends in wetlands in the state (NYDEC 2000) that may be indicative of regional trends. There is an estimated 423,000 acres

of freshwater wetlands in the Appalachian Highlands of New York state, which roughly corresponds to the New York portion of the planning unit. Wetlands comprise roughly 3% of the land area in the Appalachian Highlands and roughly 1/5 of the wetlands in the state. Uplands like the Appalachian Highlands contain fewer wetlands than adjacent ecotypes such as the lake plains of western New York that consist of large expanses of flat topography. Roughly 60% of wetlands in the Appalachian Highlands are forested wetlands, 22% are shrub/scrub wetlands, 12% are emergent vegetation and only 8% are open water wetlands.

From the mid-1980's to mid-1990's New York has lost extensive shrub/scrub and emergent wetlands. Overall there were minor gains in overall wetland (2,200 acres) in the Appalachian Highlands. Most gains resulted from agricultural reversion and from modified hydrology (increased runoff). Trends for the entire Allegheny Plateau physiographic area may be similar.

Over 50% of the wetlands in the state of Pennsylvania are concentrated in the northeast and northwest portions of the state that fall within this planning unit. Consequently, these areas are extremely important to waterfowl and other wetland species, many of which are rare within the planning unit and are found on many state endangered species lists. Currently losses in Pennsylvania are estimated at 75 acres a year statewide. Since 1990, 3,728 acres of wetlands have been restored in Pennsylvania through various regulatory and non-regulatory programs and partnerships.

Permitting of impacts to wetlands, including their destruction for development and other human uses, is done by the US Army Corps of Engineers. A more stringent permitting process would certainly benefit wetland dependent species.

Associated priority species: AMERICAN BLACK DUCK, KING RAIL, American Bittern, Black Tern, Yellow-crowned Night Heron, Marsh Wren, Least Bittern, Virginia Rail, Bald Eagle, Common Snipe, Osprey, Pied-billed Grebe, Common Moorhen, Sora.

Wetland species did not receive high priority rankings in the Allegheny Plateau, yet all of the species in this suite are listed in at least one state in physiographic area 24. The rarity of these species is primarily linked to the rarity of high quality wetlands in the region, as a result of massive filling and land-use conversion efforts in the last century. This habitat suite therefore represents continued nationwide concern for wetland habitats and their potentially vulnerable species. The large number of species that are found on state endangered species lists, however, reflect a regional concern for many species as well. American and Least Bittern and Bald Eagle are listed in all three states, and Black Tern and Osprey are listed in two.

Few species in this habitat suite are showing significant BBS population trends in the eastern United States. However, many birds in the wetland priority suite such as King, Virginia and Sora rails, Common Snipe and American and Least Bittern are particularly difficult to survey. Population estimates for many of these species therefore lack accuracy and population trends can be difficult to detect. Peterjohn and Rice (1991) state that both bittern species, as well as King Rail, have declined greatly in Ohio throughout the 20th century.

In winter, large numbers of waterfowl are supported by the larger lakes and wetlands of this region, especially the Finger Lakes of New York, and the Lake Erie shoreline portions of Ohio and Pennsylvania. Included are significant winter populations of American Black Duck, as well as large numbers of Canvasback and Redhead.

In addition, to the state listed species in this plan, the Piping Plover, a federally endangered species which is no longer extant in this physiographic region, deserves consideration. By 1973 nesting Piping Plovers had been extirpated from their former breeding range along the great lakes coastlines of Ohio, Pennsylvania and New York. Recovery efforts are attempting to expand the range of the great lakes populations and portions of the planning unit where the species formally bred have been designated as critical habitat by the US Fish and Wildlife Service. For more information on Piping Plover restoration see the Federal Register Vol. 65 No. 130, July 6, 2000 or Laura J. Ragan; (612) 713-5350.

Habitat and population objectives: Based on extrapolations from BBS relative abundances, VERY ROUGH estimates of population size for priority species in this habitat suite can be derived (Table 4.7). These crude estimates are most useful in illustrating the relative population sizes of various species and, perhaps, giving order-of-magnitude figures for setting population objectives for the region. [NOTE that for wetland species, population estimates based

on BBS data are even more tentative than for other habitat groups – better quantitative data on populations and habitat requirements are urgently needed for this group].

For species that have declined significantly during the BBS period, a population target may be set to approximate pre-BBS population levels; an annual decline of 2.4% per year corresponds with a 50% loss over 30 years. For species suffering a 50% or greater loss since 1966, this plan calls for roughly a doubling of present-day populations as a practical objective. For species showing stable or unknown trends, population targets are roughly rounded up from current population estimates. Note that the relative abundances used to for these estimates are averages across all BBS routes in the physiographic area using data from 1990-1998. For more details on methods used for calculating populations and targets, (see Appendix 3).

Table 4.7. Population estimates and targets (number of pairs) for priority species of wetland habitats in the Allegheny Plateau physiographic area. Percent of Atlas blocks based on number of 5-km blocks in which the species was reported (from Rosenberg and Wells 1995, appendix 3).

Species	BBS population	% lost Since 1966	Population target	% Atlas blocks		
				NY	PA	OH
American Black Duck	400	??	500	16	5	3
King Rail	??	??	??	<1	<1	0
American Bittern	290	Stable?	300	3	2	3
Marsh Wren	1,600	>50%	3,500	3	3	11
Least Bittern	50	??	50	1	1	3
Virginia Rail	150	??	150	6	4	22
Bald Eagle	25	??	25	1	2	2
Common Snipe	250	Stable?	250	23	1	8
Osprey	40	??	40	1	2	0

OBJECTIVE 1. Maintain a stable population of (500) breeding pairs of American Black Duck, distributed in all three states.

OBJECTIVE 2. Increase or maintain sustainable populations of freshwater marsh species, including at least (300) pairs of American Bittern, (50) pairs of Least Bitterns, (??) King Rails, and 3,500 pairs of Marsh Wrens.

OBJECTIVE 3. Support and maintain winter populations of priority waterfowl species, including ??? American Black Ducks, ??? Canvasback, and ??? Redhead.

Assumption: maintaining suitable habitat for these focal species will be sufficient to support sustainable populations of most other birds in this habitat suite.

Implementation strategy: Habitat protection for American Black Ducks is likely the most effective strategy for maintaining stable number of both wintering and breeding birds. Because American Black Ducks frequently nest in upland habitats (i.e., forests; Longcore et al. 2000a), providing undeveloped buffers of conservation land surrounding wetlands is especially important for this species. Further reductions in the harvest may be unlikely given the long period in which harvests have been low. Other specific actions directed at this habitat-species suite include:

- Wetlands used as breeding sites for these species should be protected from chemical contamination, siltation, eutrophication, and other forms of pollution/contamination that could directly harm breeding birds or their food supply.
- Preserve all large (> 10 ha) freshwater wetlands from development, draining, and other forms of habitat loss.
- Design a regional management program for these wetland species that continue to be threatened by habitat loss, including increased coordination among managers and biologists to prevent duplication of research efforts and to share current information.

- Hemi-marsh conditions favored by grebes and ducks need to be maintained by periodic reversal of vegetation succession to open up some of the extensive stands of emergent vegetation, but suitable habitat for nesting needs to be maintained in nearby areas during wetland management.
- Creation of new nesting habitat may be needed for some species in this physiographic area. Minor alterations to existing management activities for waterfowl, such as leaving some dense stands of cattail and bulrush for nesting sites and maintaining fairly stable water levels during the nesting season, should benefit many of these species. Complete drying of impoundments during drawdowns should be avoided to prevent the die-off of small fish, amphibians, and dragonflies, which are a major food source for many of these bird species. Slow drawdowns should benefit bitterns by providing suitable foraging habitat and encouraging dense stands of emergent vegetation for nesting.

Programs that support wetland gains and restoration in the state of Pennsylvania are Partners for Wildlife-U.S. Fish and Wildlife Service, the Wetland Reserve Program (WRP)-Natural Resource Conservation Service, the Pennsylvania Department of Environmental Protection-Section 319 Grants, the Watershed Restoration and Assistance Program (WRAP)-PA Dept. of Env. Protection Bureau of Watershed Conservation and the Pennsylvania Game Commission, which partners with other agencies to create wetlands and supports and highly successful stream bank-fencing program on game properties.

A list of landowner incentive programs are listed in Appendix 4 of this report and is separated out by habitat type. Landowners and managers can reference this section to locate programs that will help promote bird conservation through habitat acquisition and management and other conservation measures.

Organizations interested in the conservation of wetlands in New York include the New York State Wetlands Forum and the Western New York Land Conservancy. In Ohio the Ohio Wetlands Foundation partners with Public entities, cities, counties, park districts, state and federal agencies, buys farm land which is heavily tiled, contains hydraulic soils, is classified PC or is in the Conservation Reserve Program. It also offers a private reserve program, The Ohio Wetlands Foundation, which buys permanent conservation easements.

Other agencies and organizations that are interested in wetlands conservation issues are national and state branches of the Audubon Society, the Environmental Protection Agency, the U.S. Army Corps of Engineers, the USGS National Wetlands Research Center, the Nature Conservancy and the Environmental Defense Fund.

Important Bird Areas

Many Important Bird Areas that have been identified in the planning unit that contain important freshwater wetland habitat and will be an important focus for implementation phase of the PIF conservation plans. As a part of the IBA designation process, conservation strategies for these sites will be produced. IBAs with freshwater wetland occupying bird species are (Wells 1998, Crossley 1999):

New York

- Allegheny State Park and Allegheny Reservoir-60,000 Acres; Public (NY State off. of Parks). The reservoir is also a resting stopover for a diverse group of waterfowl including large numbers of Tundra Swans under certain weather conditions. Bald Eagles (1+ breeding pair), Ospreys (6 breeding pairs).
- Ashokan Reservoir-8,000 acres; Public (NY DEC). Primarily lacustrine, surrounded by deciduous and mixed woods and non-tidal wetlands. Bald Eagles nest and winter here. An important stop-over site for waterfowl, including Common Loon.
- Bashakill Wildlife Management Area-2,100 acres; Public (NY DEC). Non-tidal wetlands and deciduous and mixed woods. Important habitat for wintering waterfowl. It also hosts many state-listed species, including breeding Pied-billed Grebes, migratory American and Least Bitterns, nesting Ospreys, migratory Bald Eagles, Great Blue Herons, Virginia Rails, Soras, and Common Moorhens breed here. Northern Harriers,

- Catherine Creek Marsh-1,200 acres; Public (NY DEC) / Private. Non-tidal wetlands. This area hosts such breeders as Least Bitterns, American Bitterns, and occasionally Sedge Wrens. Other wetland-dependent species that breed here include Soras, Virginia Rails, Marsh Wrens, Swamp Sparrows and others.
- Cannosville Reservoir-7,000 acres; Public (NY DEC). Lacustrine with mixed woods and wetlands. Nesting Bald Eagles (1 pair) and more wintering. A major stopover site for waterfowl including American Black Duck, Common Loon, Wood Duck, Horned Grebe, Tundra Swan and Red-breasted Merganser.
- Cayuga Lake-42,400 Acres; Public/Private. Primarily lacustrine/ riverine surrounded by deciduous woods, shrub/scrub, grassland, and cultivated field. The entire lake is important migration and wintering site to high a high diversity and number of waterfowl including American Black Duck, Redhead, Canvasback, Pied-billed Grebe, Horned and Red-necked Grebe, Common Loon, Bonaparte's Gull and Caspian Tern, Black Tern and Bald Eagle.
- Chautauqua Lake-13,000 Acres; Public (NY State) / Private. Primarily lacustrine/ riverine surrounded by deciduous woods, shrub/scrub, grassland, and cultivated field. This site is an important stop-over location for migrant birds, particularly waterfowl and shorebirds. At least 270 species have been documented including Common Tern, Common Loon, Pied-billed Grebe, Black Tern and Osprey.
- Dunkirk Harbor and Point Gratiot-268 Acres; Public (municipal) / Private. Largely lacustrine but Point Gratiot habitats estimated at 40% mowed lawns, 20% beaches, 20% deciduous woods, 10% coniferous woods, and 10% shrub/scrub. Dunkirk Harbor supports significant abundance and diversity of waterbirds from fall through spring. Hosts Red-headed Woodpecker and Pied-billed Grebe.
- Gilboa Reservoir-1,500 acres; Public (NY DEC). Primarily lacustrine surrounded by mixed woods and non-tidal wetlands. One pair of nesting Bald Eagles, 5 overwinter. Important migratory habitat to Osprey, hundreds of waterfowl and migratory landbirds.
- Hi-Tor Wildlife Management Area-6,100 acres; Public (NY DEC). Some lacustrine and riverine habitat. Documented species include breeding Pied-billed Grebes, American Bitterns, Least Bitterns, Common Moorhens, Virginia Rails, and Soras.
- Keeney Swamp State Forest-2,170, Public (NY Dept. Env. Cons.) /Private. Estimated 30% non-tidal wetlands. Wetlands at the site are known to host migrant Pied-billed Grebe, American Bittern, Sora, Common Moorhen, and most regularly occurring waterfowl species (400 Tundra Swans in 1976).
- Pepacton Reservoir-7,000 acres; Public (NY DEC). Primarily lacustrine surrounded by woods and non-tidal wetlands. Area regularly hosts up to 8 individual Bald Eagles during the winter. The reservoir also serves as a stop-over site for waterbirds, including Common Loons and Ospreys and the surrounding woodlands host a diversity of migratory and breeding landbirds.
- Seneca Lake-20,000 acres; Public (NY state). Primarily lacustrine/riverine surrounded by lakeshore habitat of deciduous woods, shrub/scrub, grassland and cultivated field. An important wintering area to many species of waterfowl including American Black Duck.
- Tioughnioga River / Whitney Point Reservoir-1,360 Acres; County/state/federally owned. >50% lacustrine/riverine with some deciduous woods, shrub/scrub, and riparian habitats. an important waterfowl stopover location, hosting regionally high abundance and diversity of waterfowl. The site regularly hosts raptors including Bald Eagles, Ospreys as well as a variety of shorebirds and warblers

Pennsylvania

- Akeley and Mahaffey Wetlands – SGL 282. 500 Acres; Public (PA Game Comm.). Emergent Wetlands, some forest. Breeding species include Least Bittern, American Bittern, Sora, Great Egret, Pied-billed Grebe Great Blue Heron and Common Moorhen.

- Brucker Sanctuary-45 Acres; Private. Riparian and deciduous forest. Contains the largest Great Blue Heron colony in the state of Pennsylvania (200+ nests).
- Conneaut Marsh-5,000 Acres; Public (PA Game Comm.). The state's largest emergent marsh complex, extensive scrub-shrub, emergent and forested and wetland types, deciduous coniferous, and mixed forest of various ages. Breeding species include Am. Black Duck (2000+), Bald Eagle (2 pairs), American Bittern (3 pairs), Least Bittern (4+ pairs), Pied-billed Grebe and Marsh Wren.
- Cussewago Bottom-4,200 Acres; Public (PA Game Commission). Mostly bottomland forest and wetlands. Breeding species include Cerulean Warbler, Pied-billed Grebe (5+ pairs) and Bald Eagle.
- Erie National Wildlife Refuge-8,750 Acres; Public (USFWS). 2500 Acres of wetlands, beaver floodings, marshes, swamps, wet meadows, impoundments. Also forested valley, mixed forest grasslands and cultivated fields. Breeding species include Bald Eagle, Marsh Wren, Pied-billed Grebe, Common Snipe, American Coot, American Bittern, Black Tern, Wood Duck, American Woodcock.
- The Glades – SGL 95- 2,500 Acres; Public (PA Game Comm.). Fairly extensive and diverse wetland habitats including emergent marshes, swamps and wet meadows. Breeding species include Bald Eagle, Pied-billed Grebe, Virginia Rail, Sora, Wood Duck and Common Snipe.
- Lake Somerset-250 acres; Public (PA Fish & Bot Comm.). A shallow, man made lake, 10% of which is emergent wetland. Suitable nesting habitat for American Bittern, Least Bittern, Sedge Wren, Pied-billed Grebe, American Avocet, Ruddy Duck and Virginia Rail. An important site for migratory waterfowl.
- Moraine State Park (Lake Arthur)-16,000 Acres; Public (PA Dept. of Cons and Nat. Res.). Deciduous woodlands, wetlands, scrub and fields. Breeding species include American and Least Bittern, Sedge Wren and Common Snipe.
- Marsh Creek Wetlands – “The Muck”-1,000 Acres; Public (PA Game Comm.)/Private. Forested, scrub/shrub wetlands, emergent marsh, aquatic bed and unconsolidated wetlands. Breeding species include Great Blue Heron (30+), Osprey, Bald Eagle, American Bittern, Least Bittern, Pied-billed Grebe, Marsh Wren and Common Snipe.
- Peace Valley-1,500 Acres; Public (Country). Diverse habitats. Species include Bald Eagle, Osprey, Great Egret, Pied-billed Grebe, Northern Harrier.
- Pennsylvania Swamp – SGL 284- 1200 Acres; Public (PA Game Comm.)/Private. Cattail marshes, mature deciduous woodlands, and areas of scrub. Breeding species include King Rail, Virginia Rail, American Bittern, Least Bittern, Pied-billed Grebe, Marsh Wren, American Coot.
- Presque Isle State Park –3,200 Acres; public (PA Dept. of Cons. and Nat. Res.) Contains freshwater marshes, cottonwood and willow. American Bittern and Least Bittern, Pied-billed Grebe and possibly Black Tern breed. Up to 325 species can be found in the park. Important habitat for waterfowl and shorebirds as well.
- Pymatuning, Hartstown Complex-25,000 Acres; Public (PA Game Commission). Contains many small ponds and extensive fields. The state's largest population of Prothonotary Warbler. Breeding species include American Bittern (2+ pairs), Least Bittern (2+ pairs), Pied-billed Grebe (2+ pairs), Virginia Rail, and Sora, Common Snipe and many species of duck. An important migratory habitat for shorebirds and the state's largest concentration of nesting bald eagles.
- Quakertown Swamp-400+ Acres; Public (PA Game Comm.) / Private. Large natural wetland with wet meadows, open water, cattail marsh, shrub swamp and wooded swamp. Species include American and Least Bittern, Virginia Rail, Sora, Marsh Wren, Great Blue and Black-crowned Night heron.
- Ricketts Glen SP, Crevling Lake, Splashdam Pond SGL 13-23,050 Acres; Public (PA Dept. Cons. & Nat Res./PA Game Comm.). Swamps and shrub/scrub. Northern Harrier, Osprey and American Bittern are breeders.

- Roderick Wildlife Preserve-SGL 314-3,131 Acres; Public (PA Game Commission). 50% of the acreage is wetlands providing habitat for rails, bitterns, bald and golden eagles, blue and green herons and diverse waterfowl.
- Shenango Reservoir-3,500 Acres; Public (US Army Corps of Eng.). Flood control lake, deciduous woods, various wetlands, meadows and grass fields, open water. The greater project area includes ~15,000 acres. Important sites for migratory and non-breeding Bald Eagle, Osprey, Great Egret and large numbers of shorebird.
- Shohola Waterfowl Management Area - SGL 180-650 Acres; Public (PA Game Comm)/Private. A man made lake, small islands, wetlands and deciduous woodlands. American Black Duck, Bald Eagle and Wood Duck breed here. Important habitat for migratory waterfowl and shorebirds, wading birds and warblers.
- Upper Delaware Scenic River-38,400 Acres; Public (Nat. Park Service)/ Private. Riparian woodland, fields, young scrub, hillsides, rhododendron and laurel thickets, bogs and wetlands. Breeders include Pied-billed Grebe, Great Blue Heron (25+ pair) Osprey and Common Merganser.
- Yellow Creek State Park -3,140 Acres; Public (PA Dept. of Nat. Res.). Marsh habitat with surrounding forest, mixed woodlands. Breeders include Horned Grebe, American Black Duck, American Bittern, Virginia Rail, Sora, Common Moorhen, Marsh Wren and Green Heron.

Ohio

Many Important Bird Areas in Ohio have been nominated, but information on species present and habitat are currently unavailable (Table 3.3).

Management recommendations: Most species in this habitat suite are threatened by loss and degradation of wetlands due to drainage, filling, conversion to agriculture or recreational use, siltation, and pollution. Invasive species also play a role in the habitat suitability of wetlands to many species. In particular, purple loosestrife (*Lythrum salicaria*), an invasive, wetland exotic that out-competes native emergent species, has drastically altered the character of wetlands in parts of the northeastern United States. The changes wrought by this plant, along with changes brought about in the attempt to control it, have altered the character of some wetlands. Loosestrife may have been a factor in the decline of Black Terns at Montezuma National Wildlife Refuge in New York where high quality nesting habitat is currently lacking (Novak 1990). Effective biocontrol of this species will certainly benefit a number of bird and other species.

Preservation, protection, and improvement of wetland habitats, particularly large (>5 ha), shallow wetlands with dense growths of robust, emergent vegetation, is the most urgent management need. Wetlands used for breeding also need to be protected from chemical contamination, siltation, eutrophication and other forms of pollution that directly harm birds or their food supplies. But even small wetlands (less than five ha) may serve as important alternate feeding sites and as "stepping stones" during movements between larger wetlands. These wetlands usually receive to legal protection under state laws.

Relevant to conservation efforts to maintain populations of American Black Duck in the planning area is the possibility of more stringent regulations on hunting, or perhaps the curtailing the harvest until results show that overharvest is not the source of population decline. Furthermore, protection and maintenance of large areas of woodland edge with marshland and standing water. American Black Duck prefers a nesting cover of honeysuckle (*Lonicera japonica*) and poison ivy (*Rhus radicans*) but reeds and tall grasses will be used as well (Giles 2000). Along with hunting pressure, habitat loss and degradation, and competition with the Mallard are often cited as reasons for the species' decline. Human activities such as logging, hydroelectric development, transmission line construction, agriculture, urbanization and industrial development threaten American Black Duck.

American Black Ducks are closely associated with beaver flowages, small ponds and marshes throughout the northeast. Lack of undeveloped buffers surrounding Black Duck breeding habitat will likely contribute to a decline in habitat quality for this species, especially as urban and suburban sprawl continue to increase. Ideal cover is said to

be 40% open water, but this can be less if good forage is available year around. Shallow water may be sufficient breeding habitat, but can freeze in winter, decreasing food supply. Therefore, leaving corn stubble, soybean waste, or spreading millet will help black ducks since they would starve rather than move again after migrating. Black Ducks also eat acorns. Therefore flooding of oak stands on level ground will provide areas of optimal foraging habitat. Corn, soybean, and oat fields may also be flooded if water levels can be kept below 15 inches. Livestock and other grazers can drastically reduce nesting cover. Erecting fencing at least 50 feet from shore can help maintain suitable habitat and prevent nest trampling (Giles 2000).

American Bitterns are generally restricted to undisturbed wetlands of at least 20 acres, with dense stands of cattails interspersed with open water. They will also use shrubby wetlands and occasionally wet meadows near marshes. King Rails and Least Bitterns also require extensive, dense cattail marshes for nesting. For Least Bittern, equal ratios of cover to open water are preferred, so wetland managers may need to periodically reverse vegetative succession while maintaining suitable habitats nearby to serve as alternate nesting areas during wetland manipulations (e.g., at other wetlands in a complex).

Black Terns declines are almost rangewide in the United States and Canada. Unfortunately, habitat preservation alone will probably not ensure the recovery of the tern in regions where population declines have been substantial (Novak 1992). Factors that may degrade habitat to unsuitable conditions include successional processes, changes in water levels, invasion by exotic wetland plants, and degradation of water quality, which may alter both the food web and the vegetative structure of the wetland, have the potential to render wetlands unsuitable for use (Novak 1999). Wetland management will frequently be needed if habitat is to be made maximally suitable to terns, and may be largely compatible with current waterfowl management. In particular, encouraging activities of muskrats is an effective means to create openings and nesting substrates used by Black Terns. The effects of human disturbance is not well quantified, but many human activities have been shown to negatively impact habitat suitability and reproductive success. The ability of terns to use artificial nesting platforms may facilitate restoration efforts (Novak 1992).

Species-specific management recommendations are available online through the Nature Conservancy's Wings of the Americas website. They provide links to additional species management information available from the Northern Prairie Wildlife Research Center of the U.S. Geological Survey, Biological Resources Division, the Army Corps of Engineers, Waterways Experiment station, and the Wilderness Society's (TWS) Migratory Bird Initiative. They also reference the appropriate publication number for the Birds of North America series and provide links or contact information maintained by Partners in Flight to species accounts developed by the US Fish and Wildlife Service.

Wings Info Resources / Species Information and Management Abstracts:

<http://www.tnc.org/wings/wingresource/birddata.htm>

Research and monitoring needs: Within the planning unit, populations of none of the 18 priority species within this habitat appear adequately monitored by the BBS. Monitoring of these species will require directed efforts, and this represents an urgent need throughout the Northeast.

Monitoring production of Black Ducks is possible through an interstate network of refuges and management areas, but will require endorsement by the Flyway Council and appropriate state and federal biologists charged with managing waterfowl populations in the region. Such a need would be more likely to be filled if the region's state directors and the federal division of refuges fully embrace the concepts of PIF and the North American Bird Conservation Initiative (NABCI).

Monitoring of Black Tern populations is in progress in states in which fewer than 20 colonies are present, including New York, Ohio and Pennsylvania. Monitoring efforts will probably continue in most of these states although surveys may not be conducted on a yearly basis (Novak 1992).

Bitterns are poorly monitored by the Breeding Bird Survey's roadside protocol and no other systematic monitoring effort is underway to assess populations in the Northeast. Monitoring of both bittern species can be accomplished using broadcast surveys and can be coordinated with surveys of other marshbirds (Swift 1987, Mancini and Rusch 1988, Gibbs and Melvin 1989), many of which also are of management concern (e.g., Pied-billed Grebe and Black Tern). Population surveys should be carried out on an annual basis for a minimum of 2-3 years to provide data on

population distribution and abundance. Additional surveys can then be conducted every 2-3 years thereafter to assess populations trends. (Swift et al. 1988, Frederick et al. 1990, Gibbs et al. 1999).

Monitoring programs at Important Bird Areas are in the planning stages for several state programs. They will begin after an inventory has been taken and will be carried out by volunteers. These efforts may or may not well cover Partners in Flight priority species, but rather will be targeted at species within the IBA that met criteria in identification of the IBA. For example, a small wetland part of large grassland may lack priority if manpower is low.

Additional needs follow:

- Support efforts to monitor American Black Ducks via aerial surveys in cooperation with federal biologists;
- Identify factors that affect habitat quality for breeding Black Ducks in coastal versus inland habitats (why disturbance is important during pairing, but not during the rest of the year).
- Investigate wetland management alternatives that can provide a variety of wetland habitat conditions that are suitable to the various needs of the priority species in this habitat suite.
- A regional monitoring program to provide better abundance and population trend information is needed for the secretive wetland birds. Standard methods for conducting point-counts using tape-recorded vocalization playback have been developed and should be used in monitoring efforts. The status of the raptor species (Northern Harrier and Osprey) should also be monitored more closely and in a coordinated fashion across the region.
- Evaluate habitat requirements, including nest site characteristics, water quality, and minimum wetland area needed during both the breeding and nonbreeding seasons.
- Determine causes of breeding failure and mortality of young and adults.
- Evaluate effects of invasive plants such as *Phragmites* and purple loosestrife.

Outreach: Continue to encourage hunters to learn to identify the Black Duck, through distribution of color posters at sporting goods stores, municipal offices, wildlife refuges, etc. [add stuff]

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APPENDIX 1: ECOLOGICAL UNITS AND VEGETATION ALLIANCES

Table A1.1. Ecological Units and associated vegetation alliances within the Allegheny Plateau PIF planning unit (physiographic area 24). Modified from Keys et al. (1995). O-H-ADF = oak-hickory-ash dry forest; SM-B-B = Sugar Maple-beech-birch forest. Human use categories: F = forestry, A = agriculture, R = recreation, U = urban, M = mining.

Subunit (state)	Description	Vegetation	Human use
222Oa (NY)	Mohawk Valley	O-H-ADF, n. hardwoods, pine-heath woodland, n. white cedar forest	A, U
222Ob (NY)	Black River Valley	O-H-ADF, n.hardwoods, n. white cedar forest	A, F
212Fa (NY, PA)	Cattaraugus Highlands	O-H-ADF, SM-B-B	A, F
212Fb (NY, PA)	Central Allegheny Plateau	O-H-ADF, oak-pine dry forest, SM-B-B	A, F
212Fc (NY, PA)	Eastern Allegheny Plateau	O-H-ADF, pin oak-white oak flatwoods, oak-pitch pine woodland	F, A
212Fd (PA)	Pocono Plateau	SM-B-B, O-H-ADF, hemlock-hardwood ravine forest	F, R
212Ga (PA, NY)	Allegheny High Plateau	O-H-ADF, SM-B-B; oak-pine dry forest	F, M, R, A
212Gb (PA)	Allegheny Deep Valleys	SM-B-B; O-H-ADF, oak-pine dry forest	F, R, A
M212Ea (NY)	Catskill Mountains	Red spruce-balsam fir, SM-B-B	F
M212Eb (NY)	Catskill Highlands	SM-B-B, O-H-ADF, Cedar Glades	F, A
221Fa (NY, PA, OH)	Allegheny Plateau	Sugar maple-chinquapin oak forest, oak-heath dry forest, ridgetop pitch pine barrens, calcareous fens	F, A
221Fb (PA, OH)	Grand River/Pymatuning Lowlands	Sugar maple-chinquapin oak forest, hemlock swamp forest	F, A
221Fc (OH)	Akron Kames	Oak-heath dry forest, sugar maple-chinquapin oak forest, sedge meadow	F, A
M221Bf (PA)	Allegheny Mountain Plateau	N. hardwood forest, oak-heath dry forest	F, R

APPENDIX 2: AVIFAUNAL ANALYSIS

In this section, we provide additional details on the roughly 180 bird species known to breed within physiographic area 24. Global and physiographic area scores for all species in this planning unit can be found by accessing the PIF species assessment database at Rocky Mountain Bird Observatory: www.rmbo.org.

Species of regional importance

Species with relatively high proportions of their total populations in this region are considered of greatest importance for long-term conservation planning; ie., this region has the greatest responsibility for the long-term maintenance of their populations (Rosenberg and Wells 1995, 2000). This area does not support the highest proportion (of any physiographic area) of the total population for any species, but it does have more than 10% of the world's Blue-winged Warblers, (eastern) Willow Flycatchers, and Scarlet Tanagers, as well as > 5% of the global population for 8 other species, including Wood Thrush, Bobolink, Louisiana Waterthrush and Cerulean Warbler (Table A2.1).

Table A2.1. Species with high proportions of their world population in Area 24. Percent of population calculated from percent of range area, weighted by BBS relative abundance (see Rosenberg and Wells 2000; Appendix 3). Population trend from BBS data (% change per year from 1966-1999).

Species	% of pop.	rel. abun.	Pop. trend	P	N
Blue-winged Warbler	14.9	0.84	3.1	0.09	69
Willow Flycatcher (eastern)	11.4	2.71	3.0	0.03	65
Scarlet Tanager	10.9	5.98	-1.3	0.00	99
Gray Catbird	8.3	13.31	-0.1	ns	99
Wood Thrush	6.2	13.28	-2.9	0.00	99
Bobolink	6.1	12.46	0.4	ns	97
Louisiana Waterthrush	6.1	0.33	0.1	ns	46
Eastern Phoebe	5.3	5.33	-0.1	ns	98
Cerulean Warbler	5.2	0.19	-3.2	0.28	27
Cedar Waxwing	5.0	11.46	0.8	ns	98
Rose-breasted Grosbeak	5.0	4.53	-0.3	ns	98

Species of immediate concern

Of the 11 species with $\geq 5\%$ of their total population in the planning unit, only Scarlet Tanager and Wood Thrush have declined significantly ($P < 0.10$) since 1966 (Table A2.1). Other declining species may be of local, even if they don't rank highly in regional importance. In addition, suites of declining species may signal added regional concern for a habitat type that also supports high-priority species. A complete list of the 48 species showing declines on BBS routes in this region is presented in Table A2.2.

Table A2.2. Species showing large or significant population declines within Physiographic Area 24, based on Breeding Bird Survey, 1966-1999 trends (N = 99 routes). CF = conifer forests; HF = hardwood or mixed forests; ES = early successional; GR = grassland; W = wetland; UR = urban.

Species	Trend (% per year)	N	Significance	Relative abundance	Primary habitat
Henslow's Sparrow	-12.9	31	0.00	0.16	GR
Spotted Sandpiper	-11.4	40	0.00	0.13	W
Vesper Sparrow	-9.3	68	0.00	0.68	GR
Golden-winged Warbler	-7.9	30	0.00	0.14	ES
Horned Lark	-7.4	59	0.00	0.85	GR
Grasshopper Sparrow	-7.1	70	0.00	0.74	GR
Great-horned Owl	-6.0	21	0.06	0.04	HF, etc.
Yellow-breasted Chat	-5.9	33	0.00	0.18	ES

Northern Flicker	-5.6	99	0.00	3.90	HF
Nashville Warbler	-5.3	31	0.00	0.14	CF (ES)
Eastern Meadowlark	-5.0	95	0.00	10.07	GR
Worm-eating Warbler	-5.0	18	0.00	0.07	HF
Red-shouldered Hawk	-4.8	41	0.05	0.15	HF
Yellow-billed Cuckoo	-4.8 a	71	0.00	0.60	HF
Brown Thrasher	-4.1	95	0.00	1.80	ES
Field Sparrow	-4.1	99	0.00	9.54	ES
Eastern Towhee	-3.9	98	0.00	7.77	ES
Brown-headed Cowbird	-3.7	99	0.00	8.54	GR, ES
Canada Warbler	-3.5	46	0.01	0.38	HF, CF
Black-billed Cuckoo	-3.0	95	0.00	0.77	HF
Wood Thrush	-2.9	99	0.00	13.28	HF
Savannah Sparrow	-2.8	90	0.00	6.74	GR
American Kestrel	-2.7	79	0.03	0.76	GR, ES
Red-winged Blackbird	-2.7	99	0.00	99.29	GR, ES
Common Grackle	-2.7	99	0.00	42.23	ES (UR)
Eastern Wood-pewee	-2.5	99	0.00	4.25	HF
American Goldfinch	-2.4	99	0.00	16.43	ES (UR)
Black-and-white Warbler	-2.2	63	0.00	1.47	HF
European Starling	-2.2	99	0.00	81.31	UR
House Sparrow	-2.2	97	0.00	35.24	UR
Rose-breasted Grosbeak	-2.2 a	98	0.01	4.53	HF
White-throated Sparrow	-1.9	33	0.03	0.90	CF (ES)
Great Crested Flycatcher	-1.8 a	98	0.01	2.64	HF
Belted Kingfisher	-1.7	82	0.03	0.57	W
Downy Woodpecker	-1.6	99	0.00	2.04	HF
Song Sparrow	-1.4	99	0.00	37.74	ES
Killdeer	-1.4	97	0.00	5.73	GR, W
Cedar Waxwing	-1.4 a	98	0.02	11.46	ES (UR)
Scarlet Tanager	-1.3	99	0.00	5.98	HF
Chimney Swift	-1.3	95	0.06	6.40	U
Eastern Kingbird	-1.2	94	0.02	2.98	GR, ES
Least Flycatcher	-1.2	92	0.00	4.56	HF
Indigo Bunting	-1.1 a	99	0.00	12.50	ES
Chipping Sparrow	-1.0	99	0.00	23.44	ES (UR)
Barn Swallow	-1.0	99	0.02	24.11	GR, ES
American Robin	-0.8	99	0.01	66.30	ES (UR)
Blue Jay	-0.7	99	0.06	10.24	HF (UR)

^a Significant declining trend for period 1980-1999 only.

Increasing species

It is informative to also examine the species that are increasing significantly in a physiographic area. In the Allegheny Plateau, 38 species show increasing population trends (Table A2.3), compared with 48 species that have declined. A majority of these fall in two categories, either species associated with regenerating or mature forests, or species that have adapted particularly well to human activities or development. More forest species (18) are increasing in this region than are declining (16), including several regionally important species such as Black-throated Blue Warbler, Red-eyed Vireo, Ovenbird, and Yellow-bellied Sapsucker.

Table A2.3. Species showing large or significant population increases within Physiographic Area 24, based on Breeding Bird Survey, 1966-1999 trends (N = 99 routes). CF = conifer forests; HF = hardwood or mixed forests; ES = early successional; GR = grassland; W = wetland; UR = urban.

Species	Trend (% per year)	N	Significance	Relative abundance	Primary habitat
Common Merganser	29.5	18	0.05	0.07	W
Canada Goose	24.5	69	0.00	2.95	W (UR)
Ring-billed Gull	17.1	15	0.00	0.21	W (UR)
Wood Duck	11.8	50	0.06	0.32	W
Carolina Wren	11.2 ^a	31	0.03	0.21	UR
Red-bellied Woodpecker	10.2	37	0.00	0.49	HF (UR)
Yellow-bellied Sapsucker	10.0	62	0.00	1.25	HF, CF
Yellow-rumped Warbler	8.9	47	0.00	0.50	CF (ES)
Common Raven	8.8	29	0.02	0.30	CF, HF
House Finch	8.5	95	0.00	7.21	UR
Northern Waterthrush	8.1 ^a	22	0.01	0.12	CF, HF (W)
Wild Turkey	7.7	64	0.00	0.31	HF
Golden-crowned Kinglet	7.6	16	0.06	0.07	CF
Mallard	6.0	83	0.00	1.51	W (UR)
Winter Wren	5.6	39	0.00	0.24	CF
Black-throated Blue Warbler	5.6 ^a	40	0.02	0.41	HF, CF
Ruby-throated Hummingbird	5.3	87	0.00	0.49	ES (UR)
Turkey Vulture	4.9	71	0.00	0.63	ES
Magnolia Warbler	4.5	54	0.00	0.71	CF
Hermit Thrush	4.5	64	0.00	2.07	CF
Blue-headed Vireo	4.4	69	0.00	1.24	CF, HF
Tufted Titmouse	4.0	82	0.00	3.55	HF (UR)
Mourning Dove	3.8	99	0.00	17.21	ES (UR)
Blue-winged Warbler	3.2	69	0.08	0.84	ES
Hooded Warbler	3.0	50	0.02	0.79	HF
Pileated Woodpecker	2.9	82	0.01	0.49	HF
Tree Swallow	2.9	98	0.05	5.39	ES, W
Ovenbird	2.9	92	0.00	8.39	HF
Eastern Bluebird	2.5 ^a	96	0.07	2.05	ES
Warbling Vireo	2.4	72	0.00	1.89	HF
Great Blue Heron	2.3	83	0.00	1.10	W
Red-tailed Hawk	2.2	84	0.01	0.61	ES
Chestnut-sided Warbler	2.2 ^a	89	0.06	4.64	HF (ES)
Eastern Phoebe	1.9 ^a	98	0.00	5.33	ES, W, UR
Black-capped Chickadee	1.9	98	0.00	7.98	HF (UR)
Rock Dove	1.9	91	0.02	10.10	UR
American Crow	1.6	99	0.00	38.02	ES (UR)
Red-eyed Vireo	1.2	99	0.00	25.25	HF

^a Significant increasing trend for period 1980-1999 only.

APPENDIX 3: POPULATION ESTIMATES AND ASSUMPTIONS

In this PIF bird conservation plan, several estimates are presented of relative or absolute bird population sizes. Relative population size (percent of global population) is used to illustrate the importance of a given geographic area to priority bird species, whereas estimates of absolute population size are used to set numerical population objectives for habitat-species suites within a physiographic area. Both types of estimates are derived using Relative Abundance values from the Breeding Bird Survey (BBS). These values represent the average number of birds per BBS route, across all routes in a physiographic area, for the period 1990 through 1998 (J.R. Sauer, pers. com.). These same Relative Abundance values are used to calculate Area Importance (AI) scores in the PIF species prioritization database (see Carter et al. in press). Note that prior to July, 1999 BBS Relative Abundance was calculated differently; so any previously presented or published population estimates using these values will differ from those calculated after July 1999 (J.R. Sauer, pers. com.).

Percent of Population

The percent of total or global population (% pop) for a species is calculated according to the methods originally described by Rosenberg and Wells (1999). For species sampled by the BBS, the Relative Abundance value for each physiographic area is multiplied by the size of that area (km²) and then summed across all the physiographic areas in which the species occurred to yield a total "BBS population." The area-weighted value for each physiographic area is then divided by this total to yield the proportion of the total population in that area. Thus:

$$\% \text{ Pop} = \frac{\text{Relative Abundance (area)}}{\Sigma (\text{Relative Abundance}) (\text{area})}$$

Estimates of % Pop are relative values and are not dependent on the "correctness" of Relative Abundance values for individual routes; i.e., even if BBS greatly underestimates absolute abundance of "poorly sampled" species, such as nightjars and raptors, Relative Abundance values and % pop estimates should be valid, *as long as the detectability of a species on BBS routes is relatively constant across the range of the species*. These estimates are more questionable for species occupying very patchy habitats (e.g. wetlands) in regions where BBS routes do not adequately sample these habitats.

In cases where additional survey data for groups of species are available (e.g. waterfowl, colonial waterbirds), relative abundance and % pop estimates should be calculated with these data to compare with or replace BBS data. For some species (e.g. Piping Plover), direct censuses of populations exist and should be used to calculate the percentage of the total population in each region. Wherever supplemental data exist, these new estimates should be entered into the PIF prioritization database at Rocky Mountain Bird Observatory.

Within PIF plans, a threshold of % Pop has been determined that signifies a disproportionate abundance of a priority species in a physiographic area, or that an area shares a disproportionate responsibility for the long-term conservation of that species. This threshold is based on the size of a physiographic area relative to the total area of North America south of the open boreal forest (roughly 12 million km²). An analysis of North American bird species' distribution and abundance (K. V. Rosenberg, unpublished data) resulted in the % Pop thresholds listed in Table A3.1.

Table A3.1. Percent of Population thresholds, signifying disproportionate population size, relative to size of physiographic area.

Physiographic area size (km ²)	Percent of North America	Percent of population threshold
< 57,000	< 0.50	2
57,000 - 80,000	0.51 - 0.69	3
81,000 - 100,000	0.70 - 0.89	4
101,000 - 125,000	0.90 - 1.09	5
126,000 - 153,000	1.10 - 1.30	6
154,000 - 173,000	1.31 - 1.49	7
174,000 - 191,000	1.50 - 1.69	8
192,000 - 222,500	1.70 - 1.89	9
223,000 - 246,000	1.90 - 2.10	10
300,000 - 500,000	2.60 - 3.50	15
> 600,000	> 5.0	25

Absolute population estimates

In order to set appropriate and justifiable habitat goals within physiographic areas, it is usually necessary to first set numerical population objectives for priority bird species. Population estimates rarely exist, however, for most nongame bird species. For relatively widespread and common species of forest, shrub, and some grassland habitats, the BBS may provide a landscape-level density estimates that can be converted into regional population estimates if the following assumptions are made:

- (1) BBS routes constitute a random sample of the landscape;
- (2) habitats in question are fairly evenly distributed across the region; and
- (3) each bird species has a relatively fixed average detection distance at BBS stops, within which a reasonable estimate of the number of individuals present may be obtained.

Because BBS route locations are selected at random (ref), the first assumption is reasonable. Furthermore, several studies have shown that common habitat types are represented along secondary roads used as BBS routes in roughly the same proportions as in the overall landscape (refs). The third assumption is the most problematic; although most species probably do have a fairly constant average detection distance, selecting that distance is difficult and has a large effect on total population estimates. For example, an entire BBS route composed of 50 stops, each consisting of a 0.25 mi. (400 m)-radius circular count, potentially surveys roughly 25 km² of heterogeneous landscape. For a species that is detected routinely only out to 200 m at each stop, the effective area surveyed is reduced to 6.3 km²; for a species detected only out to a distance of 100 m, the BBS route surveys 1.6 km². A simple method of extrapolating avian density from counts of singing males using detection threshold distances was proposed by Emlen and DeJong (1981), who also provided average maximum detection distances for 11 species of common forest birds. These distances ranged from 72 m (Blue-gray Gnatcatcher) to 186 m (Wood Thrush) and averaged 128 m for the 11 species. Emlen and DeJong (1981) further proposed that numbers of singing males be doubled to obtain a total population estimate and that a correction factor be applied to account for variable singing rate (i.e. birds that were missed because they didn't sing during the survey period).

In the absence of additional empirical data on species-specific detection distances and singing frequencies, we may take a simple and conservative approach to estimating regional population sizes from BBS relative abundance data. Species were initially placed in three categories, according to their presumed detection-threshold distances. A majority of forest-breeding songbirds and similar species of scrubby and open habitats were assigned a detection distance of 125 m (close to the average distance for forest birds in Emlen and DeJong's study) -- for these species a BBS route samples an effective area of 2.5 km². A second group of species that are detected primarily visually or have unusually far-carrying vocalizations in open habitats were assigned detection distances of 400 m; i.e., they are detected out to the limit of each BBS circular stop (e.g. raptors, Upland Sandpiper). For these species the BBS samples roughly 25 km². A third group of species is considered to be intermediate and was assigned a detection distance of 200 m (effective sampling area = 6.3 km²). These include species, such as Bobolink and Eastern Meadowlark, that are detected by a combination of song and visual observations in open habitats.

Population estimates for a physiographic area are then calculated as the average landscape-level density (number of birds per route * effective area sampled by each route) multiplied by the size (km²) of the physiographic area. Note that landscape-level densities are not assumed to be similar to species densities in uniform optimum habitats, but rather reflect habitat heterogeneity at larger scales as sampled by BBS routes. Because the great majority of detections on typical BBS routes are of singing or displaying males, the population estimate derived from this method is assumed to represent number of breeding pairs, unless specifically noted otherwise.

Setting population targets

Once an estimate of the “BBS Population” is calculated, this estimate may be used to set an approximate population target that a particular conservation plan can strive to achieve. For species with stable or unknown population trends in a region, the estimate of the current population may serve as a reasonable target for a sustainable population in the future; i.e. no further loss. For species that have declined significantly, however, a conservation plan may strive to reverse declines and restore populations to some historic level. BBS trends can tell us how much of a population has been lost since the beginning of the survey, or 1966. For example, a population that has declined by 2.7% per year for 30 years has suffered a 50% loss overall during this period, and even a population that has declined by 1% per year has suffered a 20% loss over 30 years. A reasonable objective, therefore, and a primary goal of the PIF conservation plans, is to restore populations to their pre-BBS levels. Many species have declined by even greater amounts, however, and it may not be practical to ever restore historic populations completely. For these species that have declined by *at least 50%*, we may set a *minimum* target of doubling the present-day population through habitat protection and restoration.

Clearly, much additional research and analysis is necessary to (1) test assumptions of this approach, (2) provide refined empirical estimates of detection distances and frequencies that can be applied to density estimation, and (3) to develop independent means of estimating population size in order refine or calibrate estimates derived from BBS data. The crude population estimates provided in this PIF plan are a reasonable starting point, however, that are based on the best information yet available, and that can serve as preliminary population objectives for priority species in each physiographic area. These population objectives can then be translated into habitat objectives, with the goal of assuring the long-term sustainability of priority species in each region. As better population data become available, these should be incorporated into later versions of the PIF conservation plans.

APPENDIX 4: LANDOWNER INCENTIVE PROGRAMS

Taken from Maryland PIF (1997):

There is a wide variety of incentive programs for private landowners designed to promote forest conservation and management, agricultural best management practices, and other conservation measures. Many are intended specifically to benefit wildlife. Many more provide varying degrees of incidental benefit to wildlife habitat. Incentives range from technical assistance, cost-sharing, or direct payments to property tax benefits, and both state and federal income tax deductions. Among the many relevant state and federal laws, the "Federal Agricultural Improvement and Reform Act of 1996," commonly known as the 1996 Farm Bill, is of special interest, since it is the major source of federal funding for conservation programs for privately owned land.

Indeed, the number and variety of programs, of agencies that administer them, and of eligibility conditions seem at times bewildering in their complexity. Individual programs that are here today may be gone tomorrow as federal and state priorities, laws, and appropriations change. In this brief account, it is possible to mention only some of the most important and to suggest where the landowner should go for more complete accurate, and current information.

Forestry Incentives

Forestry incentive programs are generally intended primarily to conserve forested land as forest and to promote reforestation and good forest management. Although the individual landowners' objectives may vary, the overall goals are to ensure a continuing supply of forest products while also providing such environmental benefits as clean water, clean air, wildlife habitat, recreation, and natural beauty.

The **Forest Stewardship Program (FSP)** in conjunction with the **Stewardship Incentive Program (SIP)** and the **Woodland Incentive Program (WIP)** are among the most important assistance programs for non-industrial private forest landowners. SIP is federally funded under the 1996 Farm Bill. WIP is funded by the state and user fees. The administering agency will vary by state. These programs provide both technical assistance and cost-sharing for reforestation and various forest management activities. Landowners' objectives under FSP may include wildlife habitat enhancement or the protection of soil, water quality, wetlands, and streams. They may also include, but are not required to include, the production of timber and other forest products. To be eligible, landowners must have at least 1 and no more than 1,000 acres of non-industrial forest land and an approved Forest Stewardship Plan covering all the contiguous forest and meet other requirements. In Maryland, the SIP may be combined with the **Buffer Incentive Program (BIP)**, also administered by a state agency, which provides one-time payment for planting forested riparian buffers. This program may not be available in other states.

The **Forestry Incentives Program**, also federally funded under the 1996 Farm Bill, provides up to 65 percent cost-share assistance for tree planting, site preparation, and timber stand improvement. Its primary purpose is to increase future supplies of softwood sawtimber and to continue sustained-yield, multipurpose management of private non-industrial forest land. Requirements include an area of 10-1,000 acres, with the potential to produce at least 50 cubic feet per acres per year, and a forest management plan. Those interested should check with their Project Forester or Soil Conservation District (see below) for current information.

Private forest landowners may also be eligible for a variety of tax incentives. Under the **Forest Conservation and Management Agreement (FCMA)** program, the assessment of forestland for property tax purposes may be frozen at a use-rate valuation of \$100 per acres. The agreement requires a Forest Stewardship Plan prepared by a professional forester and approved by the Forest Service on a minimum of 5 contiguous acres. The landowner must sign a 15-year legal contract with the state to follow the plan. There are entry and inspection fees and back-tax penalties for premature withdrawal or nonperformance.

There is also a **Federal Income Tax Incentive (PL96-451)** that permits up to \$10,000 of capitalized reforestation costs each year to be eligible for a 10-percent investment tax credit and a 7-year amortization. Federal timber tax law is complicated and poorly understood, even by many IRS agents and other wise qualified accountants. It is best to consult an expert in this specialized field for advice.

Agricultural and Wetland Incentives

There are numerous incentive programs for instituting agricultural best management practices (BMPs) and various conservation practices, generally related to control of soil erosion; the protection of streams from sediment, excess nutrients, and other pollutants; management of animal wastes; and the preservation or restoration of wetlands. Incentives include³ technical advice, cost-sharing, and direct payments.

Most of the conservation programs available to farmland owners are provided under the 1996 Farm Bill. The Primary sources of information for landowners are the local offices of the USDA Farm Service Agency (FSA), the Soil Conservation District (SCD), the USDA Natural Resources Conservation Service (NRCS), and the Cooperative Extension Service-these last two having offices in each county.

The **Conservation Reserve Program (CRP)** is intended to protect highly erodible and environmentally sensitive croplands by encouraging landowners to establish grass, trees, or other long-term cover in order to reduce soil erosion, improve water quality, and enhance wildlife habitat. As a benefit for nesting birds, grass-planting contracts now provide that the grass cannot be cut before July 15. The program offers cost-share assistance and annual rental payments. Marginal pastureland may be eligible if it will be devoted to a riparian buffer to be planted to trees or other wildlife cover. Eligible acreage is ranked by the expected environmental benefits. Factors considered include vegetation most beneficial to wildlife, water and soil quality benefits, and tree plantings. Contracts are from 10-15 years. The program targets environmentally sensitive croplands and encourages producers to plant long-term conserving cover to improve soil, water and wildlife habitat.

The **Environmental Quality Incentives Program (EQIP)** combines the functions of the former Agricultural Conservation Program and Water Quality Incentives Program, among others, and is intended to maximize environmental benefits per dollar expended. It provide technical and educational assistance to farmers and cost-share and incentive payments up to 75 percent of cost for conservation practices such as manure management facilities, riparian corridor management (including streambank stabilization, tree planting, and fencing), pastureland management and cropland erosion control practices. Nationally, overall funds are allocated half for crop production and half for livestock operations. The primary focus is soil conservation and water quality, but incentive payments can be made for wildlife habitat management.

The **Wetlands Reserve Program (WRP)** as amended under the 1996 Farm Bill offers landowners financial incentives and technical assistance to enhance wetlands in exchange for retiring marginal agricultural land. It focuses on restoring and protecting wetland to enhance water quality and wildlife habitat. It provides for an enrollment cap of 975,000 acres, one third to be placed in permanent easements, one third in 30-year easements, and one third in restoration-only cost-share programs. The renewed “**Swampbuster**” provisions are designed to induce farmers not to drain agricultural wetlands or else to mitigate losses.

The **Conservation of Private Grazing Land** initiative is designed to provide landowners with technical, educational, and related assistance to improve management of private grazing lands.

Wildlife Programs

Traditionally, most government wildlife programs have been geared to game species such as grouse, turkey, quail and ducks. Many projects designed to improve wetlands and other habitat for game species will also benefit nongame species, as will the more general wildlife habitat enhancements offered through forestry and agricultural programs. For more detailed information, contact your state wildlife agency, local SCD and NRCS offices, and the US Fish and Wildlife Service (USFWS).

The **Wildlife Habitat Incentives Program (WHIP)** under the 1996 Farm Bill provides \$50 million over the life of the bill for wildlife habitat improvement on private lands. It is designed to address regionally specific goals by providing cost-share payments to private landowners to improve food, shelter, and nesting areas. Unlike most agricultural programs, it is not restricted to productive farmland but may be available to relatively small holdings. For eligible practices, NRCS will pay up to 75 percent of the establishment costs, up to \$10,000. Projects must be maintained for at least 10 years. The program may be used for the establishment of native warm-season grasses.

USFWS programs that emphasize wetlands include North American Waterfowl Management Plan Joint Venture Projects, which offer financial assistance for the restoration of wetlands significant to waterfowl and other wetland-dependent species; and the North American Wetlands Conservation Act, which provides funding for cost-share grants for wetland conservation projects involving acquisition, restoration, and enhancement.

Several private organization also have programs to improve habitat for game birds and sport fish. Among these are Ducks Unlimited, Trout Unlimited, the Izaak Walton League, the Ruffed Grouse Society, Quail Unlimited, and Pheasants Forever. While specifically designated for the benefit of game species, their programs may also benefit nongame wildlife. For example, the Chesapeake Bay Foundation and Ducks Unlimited are engaged in a multiyear initiative to restore, protect and enhance wetlands, stream buffers and wildlife habitat in Maryland, Virginia and Pennsylvania. Pheasants Forever, as another example, has supported landowners wishing to establish warm season grasses.

Conservation Easements

Conservation easement programs may be used to preserve from development farmland, forest land, wetlands, and other real property with conservation values. Generally, they restrict the use of land to specified purposes such as farming, forestry, or wildlife conservation. While permitting the landowner to continue managing the land productively, they generally prohibit or sharply restrict future development. Most easements are required to be in perpetuity. Most easement programs are voluntary but some easements are mandatory (e.g., under the Forest Conservation Act).

Easements may be donated to private or public land trusts or they may be transferred in a “bargain sale” for less than full market value. Generally, depending on the individual conditions of the contract, the granting or “bargain sale” of a conservation easement will provide the landowner with income, property, and/or estate tax benefits.

According to a 1994 Land Trust Alliance survey, of the 1,100 land trusts in the United State, 80 percent devote at least some attention to protecting wildlife habitat (American Farmland, Summer 1995).

Other programs provide direct payment to the landowner in exchange for a restriction on future development. IN some cases these may also involve the transfer of development rights to an area designated for intensive development. Sale of easements frequently result in a capital gains tax to the seller but because the loss of development potential usually lower the market value of the property, it may result in lower property or estate taxes.

Programs that provide for the purchase of development rights include the federally funded **Forest Legacy Program** (reauthorized in the 1996 Farm Bill). The 1996 Farm Bill also introduced a new federal **Farmland Protection Program** to provide up to \$35 million in additional support to states that have farmland conservation programs for the purchase of easements so that farmers can preserve their land in agriculture.

Natural Area Registries programs have been established to recognize landowners with areas of special significance. They provide some technical advice and a personal sense of stewardship but no financial benefit. Interested landowners should consult The Nature Conservancy.

APPENDIX 5: IMPORTANT BIRD AREAS PROGRAM IN THE ALLEGHENY PLATEAU PHYSIOGRAPHIC AREA

The Important Bird Area program is already making great strides in on-the-ground conservation efforts in the Allegheny Plateau. As an example of its progress, IBA's in New York are thought to include 95% of the Cerulean Warbler and 87% of the Piping Plover population in the state. Current inventories of birdlife at these sites are incomplete and a full assessment of habitat are sometimes lacking as well. However, as the state programs progress, more sites will be identified and better inventories of the bird life will be available. Where significant acreage of a particular type of habitat is present or where priority species are resident or migrants IBA's have been included in the implementation section of each habitat section.

Table A5.1 Important Bird Areas in the Allegheny Plateau planning unit (Area 24) and the state of New York. IBA's are given with site numbers referencing site descriptions in Crossley (1999).

Site Name of New York IBAs	Page #
Allegany State Park and Allegany Reservoir	175
Ashokan Reservoir	132
Bashakill Wildlife Management Area	129
Cannosville Reservoir	110
Caswell Road Grasslands Complex	224
Catherine Creek Marsh	219
Catskill Peaks	120
Cayuga Lake	176
Chautauqua Lake	178
Connecticut Hill	226
Dunkirk Harbor and Point Gratiot	180
Finger Lakes National Forest	220
Franklin Mountain Hawkwatch	111
Gilboa Reservoir	119
Happy Valley Wildlife Management Area	215
Hemlock and Canadice Lakes	196
Hi-Tor Wildlife Management Area	211
Keeney Swamp State Forest	172
Letchworth State Park	198
Long Pond State Forest	185
Pepacton Reservoir	112
Pharsalia Woods	186
Ripley Hawk Watch	181
Salmon Creek	225
Seneca Lake	209
The Center at Horseheads Fields	183
Tioughnioga River / Whitney Point Reservoir	174
Wheeler's Gulf	182
Widger Hill	223

Table A5.2 Important Bird Areas in the Allegheny Plateau planning unit (Area 24) and the state of Pennsylvania. IBA's are given with site numbers referencing site descriptions in Crossley (1999).

Site Name of Pennsylvania IBAs	Site #
Akeley and Mahaffey Wetlands – SGL 282	15
Brucker Sanctuary	8
Callen Run Research Area	20

Conneaut Marsh	7
Cook Forest SP	19
Cussewago Bottom	4
Dutch Mountain Wetlands Complex – SGL 57	48
Erie National Wildlife Refuge	6
Hemlock Hill Research Area	5
Hickory Creek Watershed	17
Hickory Run State Park	65
Lake Somerset	25
Long Pond Preserve, Barrens	64
Marsh Creek Wetlands – “The Muck”	27
Moraine SP (Lake Arthur)	12
Mount Zion (Piney Zion)	21
Oil Creek Valley / Oil Creek SP	18
Pennsy Swamp – SGL 284	10
Pine Creek Gorge Natural Area	28
Pocono Lake Preserve	63
Powdermill Nature Reserve	24
Presque Isle SP	1
Promised Land SP, Bruce Lake Natural Area	62
Pymatuning, Hartstown Complex	3
Quehanna Wild Area	31
Ricketts Glen SP, Crevling Lake, Splashdam Pond SGL 13	49
Roderick Wildlife Preserve-SGL 314	2
Senango Reservoir	9
Shohola Waterfowl Management Area - SGL 180	61
Southern Sproul SF	31
Tamarack Swamp	29
The Glades – SGL 95	11
Tionesta Natural Scenic Area	16
Upper Delaware Scenic River	60
Wyoming State Forest	42
Yellow Creek SP	23
Youghiogheny Valley, Ohiopyle SP	26

Table A5.3. Important Bird Areas in the Allegheny Plateau planning unit (Area 24) and the state of Ohio (Ritzenthaler pers. comm).

Site Name of Ohio IBAs	Site #
Big Creek Park	4
Cuyahoga Valley Nat. Rec. Area (Lower Cuyahoga River Complex)	12
Cuyahoga Valley Nat. Rec. Area (Ira Road Trailhead)	13
Deep Lock Quarry Metro Park (Lower Cuyahoga River Complex)	14
Diamond Shamrock Property—former (Grand River Complex)	15
Eldon Russel Park—Upper Cuyahoga River	19
Girdled Road Reservation (Grand River Complex)	23
Gordon Park Impoundment / Dike 14	24
Grand River Terraces (Grand River Complex)	25
Grand River Watershed (Grand River Complex)	26
Grand River Watershed (Grand River Complex)	26
Grand River Wildlife Area (Grand River Complex)	27
Headlands Beach State Nature Preserve and Environs	29

Hell Hollow Wilderness Area	30
Hinckley Reservation	31
Mentor Marsh Area Regional Ecosystem (Grand River Complex)	45
Mohican State Park and Forest	49
Mosquito Creek Corridor (Grand River Complex)	50
North Chagrin Reservation, (with A.B. Williams Memorial Woods	51
RW Sidley Property Property (adj. Headlands Dunes SNP)	59
Shenango Wildlife Area (Grand River Complex)	64
Wilderness Center	70